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The Wavelength and Frequency of Light are Reversed

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by Miles Mathis

Abstract: I will show that the wavelength and frequency of light have been misassigned for centuries. All along they have been assigned to the sine wave created in diagrams rather than to the actual spin motion of the photon. This was caused by treating light as a field wave, although we have known light doesn't travel as a field wave for more than a century. I will show how to correct this, by analyzing closely the way an interferometer works. I will show that the equation $c = \lambda \upsilon$ is incomplete. Then I will rewrite the photon energy equations, showing how to dissolve Planck's constant h out of them altogether.

Part 1: History

Over the past decade, I have shown that the standard model of physics in all areas is upside-down in many places. Here is one more place that it is upside-down. I have been saving this one for a while, because it is a what you might call a doozy. I was waiting until one of my readers noticed it before I wrote a paper on it. I have dropped so many bombs on the physics world in the past few years that I really wanted to sit on this one for a bit longer, while the other bombs sank in. But now that my first reader has noticed it, I can't hold my explanation any longer.

Several years ago I solved the superposition problem of light by discovering that light is not a field wave like sound. It is not a pattern on a background. At the fundamental level, it is not a like a sine wave created by a "wavefront" or any other collection of photons. No, the wave belongs to each and every photon, and is caused by the spin of each particle. Locally, the wavelength of the photon is just its radius, and the frequency is determined by the speed of spin. The linear speed of the photon then stretches out the wavelength and slows down the frequency, giving us the photon we see and measure. That beautifully solves a lot of problems with light, because it explains not only superposition but also entanglement, partial reflection, the single photon problem, and many others. In addition, it allowed me to unify the photon with other quantum particles. However, it immediately created a problem for me personally, and until now no one saw it. Maybe some clever mainstream chaps saw it immediately and used it as an excuse to write me off, but I doubt it. There have been a lot of people attacking me for various reasons, and if any of them had seen this they would have used it against me.

It is a problem because it implies that energy increases with wavelength, whereas current theory gives larger wavelength light a *smaller* energy. Energy is proportional to frequency, not wavelength, by the equation $E = h\upsilon$. This would seem at first to be a major problem for my spin theory, except that it turns out that my theory is correct and the old theory is wrong. I have already shown that light is not an analogue to sound or any other field wave, so this shouldn't come as such a shock to you. But I know it will anyway, so I rush to explain.

To see how this could happen, we have to go all the way back to James Gregory and his bird feathers, around the time of Newton and his prisms (circa 1670). Gregory found that bird feathers acted as a diffraction grating, splitting light into its components just as the prism had. Because the diffraction grating was composed of narrow bands, the logical conclusion was that the feather was directly affecting the wavelength. If we add to this the fact that Newton had been giving the effect to the wavelength in the prism, we see why that characteristic of light was called the wavelength and the other characteristic of light was called the frequency. The characteristic that got larger with energy was called the frequency and the characteristic that got smaller was called the wavelength. This was explicitly to match the math and diagrams to the math and diagrams that already existed for sound. Sound was already known to be a wave (from Leonardo and Galileo), and light was just tacked onto existing theory as if it were already known to be a field wave. To say it another way: **Light was given a sine wave, and frequency and wavelength were assigned to that sine wave instead of to the light itself.**

But since light was never a field wave like sound, this assumption was always incorrect. It was a jump to a conclusion, and that jump is still holding us back over 300 years later. It has never been seriously questioned since then. Until now.

Part 2: the Diffraction Grating

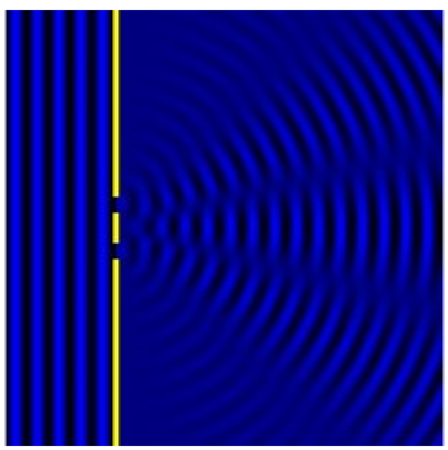
We can see this most clearly by studying the diffraction grating more closely. With sound or any other field wave or sine wave, it is clear that the diffraction grating would be working by interfering with the spacing between wave crests. The theory of that is clear and we all know of the diagrams showing it. I am not here to question that, so don't worry. But since at the fundamental or physical level, light isn't a field wave or a sine wave, *all those diagrams don't apply.* You have to throw them out and start over, and that isn't easy. It is like watching *Cheers* every week for 11 years and then having to get used to watching *Frasier* instead. The brain initially rebels.

But bear with me. As we look more closely at the mechanics of a diffraction grating, remind yourself that Newton himself initially gave his corpuscles of light spin to explain their motion through his prism. Huygens criticized him harshly for this, and under this pressure Newton made one of his worst mistakes ever (regarding motion to the normal). After that, Newton basically gave up on a mechanical explanation, reverting into math. But that doesn't change the fact that Newton toyed with the idea of spin as an explanation of refraction and diffraction. He was *so close* to the right answer, as we are about to find out.

The diffraction grating is a little easier to analyze than the prism, so we will stick to that in this paper. But if you want to read my comments on the prism, they have already been published in a previous paper. Since we have a particle with spin rather than a field wave, how will that change our interaction? Let's look at the current explanation first, from our old pal Wikipedia:

When a plane wave of wavelength λ with normal incidence, (perpendicular to) the grating, each slit in the grating acts as a quasi point-source from which light propagates in all directions (although this is typically limited to a hemisphere). After light interacts with the grating, the diffracted light is composed of the sum of interfering wave components emanating from each slit in the grating. At any given point in space through which diffracted light may pass, the path length to each slit in the grating will vary. Since the path length varies, generally, so will the phases of the waves at that point from each of the slits, and thus will add or subtract from one-another to great peaks and valleys, through the phenomenon of additive and destructive interference. When the path difference between the light from adjacent slits is equal to half the wavelength, λ/2, the waves will all be out of phase, and thus will cancel each other to create points of minimum intensity. Similarly, when the path difference is λ, the phases will add together and maxima will occur.

Not what I would call a crystal clear explanation, but it certainly mirrors what I was taught years ago, so nothing much has changed. For instance, what is a "quasi point-source"? You either have a point or you don't. There is no such thing as a quasi-point. And a real diffraction grating creates nothing like a point source. Each grate and each gap has a real width, one that cannot be ignored. How does a gap, by itself, turn the light ray, and how does it turn some more than others? We have never gotten a good answer to that.



We have always just gotten a drawing of what actually does happen, but the explanation explains nothing to this day. How does a wave front or wavelength get turned? And if light is composed of photons that have no mass or radius, how are they turned? Feynman prefered the particle theory of light, but with diffraction he reverted either to waves or to path sums. No talk of particles here, since gaps cannot turn point particles.

We can't blame Wikipedia here, since they are just repeating the advice of Huygens from three centuries ago. Yes, Huygens explanation of diffraction is still current, and his old theory is where we got the quai-point source and all that other stuff. But notice that we can make some progress simply by changing "wavelength" to "frequency" in the explanation above.

When the path difference between the light from adjacent slits is equal to half the frequency, $\upsilon/2$, the frequencies will all be out of phase, and thus will cancel each other to create points of minimum intensity. Similarly, when the path difference is υ, the phases will add together and maxima will occur.

Wow, that begins to make more sense already. No one has ever explained how wavelengths could physically stack, even if real photons were colliding. But with spins it is quite easy to visualize. Spins could stack or cancel in collision, because they can transfer energy in a direct mechanical way. How do wavelengths stack or cancel in collision? A wavelength is just a distance—either in my theory or in the mainstream theory—and you can't sum distances into an increased energy. But since in my theory the frequency is actually a measurement of spin velocity, the frequencies can be summed into an increased energy. Energy is not a function of distance, but it *is* a function of velocity. As in the equation $E = \frac{1}{2} mv^2$.

You will ask me to clarify that. If the wavelength is the spin radius, then frequency is the number of times per second (say) that a point on the spin circumference returns to the same spot. And if that is true, then the frequency is just another measurement of the velocity of that point on the spin circumference. Frequency is measured as 1/s, say, with the 1 unassigned as a matter of distance. But if we know the radius, then we can assign the 1 to some real number, like 1 meter, which gives us a velocity. Given a spin and a radius of spin, a frequency gives us a velocity. So with spin, the frequency and the velocity are actually the same thing. And if the thing that is spinning has any mass, then the velocity will give us an energy. I have shown that the photon has a mass, so the velocity does give us an energy. This explains how the photon has energy.

And it explains how the photon increases its energy. I have shown that photons increase energy by stacking spins. Once the tangential velocity of our point on the circumference reaches c, it cannot increase any more. If the photon wants to add energy from a collision, it has to add another spin on top of the existing spin. It does that by going beyond that spin, so that the second spin has twice the radius of the first. But this means that a photon with more radius has more energy, and less frequency. The variables have reversed.

Part 3: the Diagrams

That's all very important, but talking about energy may not be as convincing to readers as looking at diagrams. So let me switch gears and hit this problem from another angle, one that will be almost certain to convince you I am right. As we know, the light wave is currently drawn as some sort of sine wave. Well, what happens if we turn a spin wave into a sine wave? Consult this animation provided me by Chris Wheeler. It shows how two spins create a wave pattern on a background, with no field of particles necessary.

wave.wmv
wave.mov

Expect to wait 30 seconds for the wmv file to download.

And here's a bit simpler animation I borrowed from Wikipedia, which shows the basic creation of a sine wave from a spin, though it complicates the problem with sin and cos.

What you will see is that if we create a sine wave from spin motion, it is actually **the frequency of the**

spin that creates the wavelength of the sine wave. Yes, the frequency determines the length of the wave. You may have to study it for a while and think about it, but it is true. If we go back to our point on the circumference of spin, we take that point as a wavecrest. The gap between wavecrests is the time it takes that point to make one rotation. So the *length* of the sine wave is caused by the *frequency* of the spin! When we think we are measuring wavelength, we are really measuring frequency. This is where the switch is made.

Notice I am *not* just saying the sine wavelength is function of the frequency. That is what current theory says, so I would not be stating anything revolutionary by stating that. I am saying that the sine wavelength is created by the *spin* velocity. But I am saying even more than that. I am saying that—although current diagrams get a sine wavelength from a spin velocity—there is in fact *no* sine wavelength. The sine wave doesn't exist in real life because *there is no field*. We cannot assign our "wavelength" to a sine wave on a diagram, because you cannot diagram something that does not exist. The only thing that exists is the spin of the photon, which is a frequency, not a wavelength. The wavelength isn't a function of the frequency; **the wavelength is manufactured** in the diagram from the frequency. The frequency exists, the wavelength does not.

In other words, we are currently assigning the variable λ to something that does not exist. We are assigning it to the wavelength on a sine diagram, but that diagram is not applicable to the real field. *The photon doesn't have a wavelength of that sort.*

And what we currently call the frequency of light is also manufactured, since it comes from the sine-wave diagram as well. Currently, the frequency of light is actually the frequency of the sine wave on the sheet of paper, not the frequency of the photon spin. They aren't the same thing, as we will see below.

As you now see, our current variables are assigned to a manufactured sine wave. But physically, light is a spin wave, not a sine wave. The photon itself is moving as a spin wave, not as a pattern on a background.

Part 4: the Equation $c = \lambda\nu$

You will say, "But if a *smaller spin frequency creates a larger sine wavelength,* that is no different than current theory. That *is* current theory. A smaller frequency goes with smaller energy. I don't see the switch you are talking about." But current theory doesn't assign frequency to a spin frequency, it assigns it to a sine wave frequency. Plus, I have already shown that there is no sine wavelength. The spin frequency doesn't actually create anything. *Physicists* create the sine wave with a diagram, but no such wave exists. A sine wave is a field wave, and we have no field here. That is what Michelson/Morley was about, remember? That is what Relativity is about, remember? By the current interpretation of both, light does NOT travel via a field. So how can physicists continue to diagram light as a field wave?

Beyond that, I will show that in the interferometer, a smaller spin frequency does *not* go with a larger wavelength. No, the reverse is true. We will see that a larger spin frequency goes with a larger (manufactured) wavelength.

But before we get to that analysis, we will look at a few more things, as preparation. Let us return for a moment to my first analysis, where I talked about velocity, and creating a velocity from a frequency. It would clear up a lot of things if we stopped talking about frequency and started talking about velocity.

Current theory hides out in frequency with light because it has no way of calculating spin velocities. Current theory doesn't even understand the difference between tangential velocity and orbital velocity, as I have shown exhaustively elsewhere, so they prefer to talk of frequencies. But frequencies are imprecise things. Spins with completely different radii can have equal frequencies, by accident. To really know what is going on, we need both a frequency and a radius, which will give us a velocity. Since I have now calculated a radius for our photon, we don't need to hide away in frequencies. We can talk about velocities instead.

We need to get into spin velocity here instead of frequency, because although you can calculate one from the other very easily, they aren't necessarily proportional. Yes, if the radius is constant, then if you increase a spin velocity, you will increase the frequency. But we *aren't* keeping the radius constant here, remember. That is the complexity that my questioner is missing. As the energy increases, so does the radius of our photon. Well, if we increase the radius and keep the same frequency, the spin velocity must rise. We could even increase the radius, lower the frequency, and the spin velocity would still rise. So the basic problem is that the current equations don't include any of that complexity, because they don't take into account the changing spin radius.

This is another reason the current equations have existed so long in a reversed state: the equation $c = \lambda\upsilon$ is too simple. Because it includes neither the spin velocity of the photon nor its radius, it is completely opaque to any and all mechanics. It is opaque to analysis, as we are finding out. That equation has prevented analysis of this problem since the time of Newton. And even with all the diagrams and analysis above, we still haven't completely gotten to the bottom of this.

You see the basic problem is that the equation $c = \lambda\upsilon$ only applies to the old field waves, like sound. It doesn't apply to light, because it has no way of representing the increasing radius of the photon as we move up from infrared to ultraviolet. That equation applies only to a point source, or at best to a particle with a constant radius. But it can't be applied to our photon, since it has no way to include the *changing* radius. That is another reason current physicists resist giving the photon size. If they give the photon *any* radius, they have to rewrite all these equations like I am doing. They haven't wanted to do that, for what are becoming obvious reasons. It isn't that easy.

What we have to do is replace frequency with velocity, jettison the equation $c = \lambda\upsilon$, and reassign the remaining variables to the photon instead of to the sine wave.

Part 5: the Data

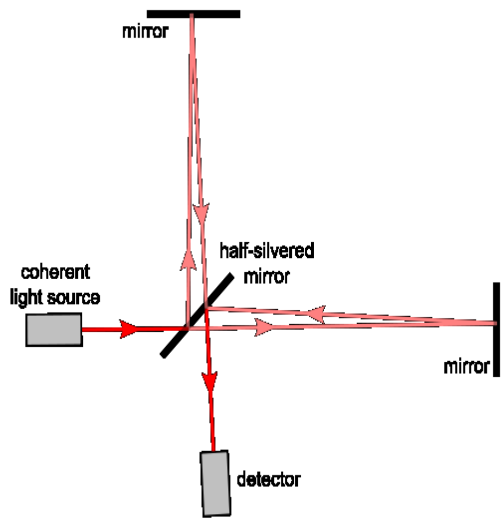
Before we do that, I will answer one more question. Many readers will be shaking their heads, saying, "For heaven's sake, this cannot be true! Don't we have ways to measure the frequency and wavelength of light? Are you saying all the machines are wrong?" I am not saying the machines are wrong, I am saying the math is wrong. And no, we don't have any way to measure the frequency or wavelength of light directly. This is admitted regarding frequency, which is simply a derived number, taken from the equation I just threw out. But if you look closely, you will find that wavelength is also a derived number. It isn't measured directly either. Yes, it is measured "directly from data" from machines like interferometers, but it isn't the wavelength being measured in the data. It is "measured" by counting the number of fringes or something like that. The physicists then simply *assume* that the fringes are caused by wavelength, and they find a way to develop a number for that wavelength. But since that wavelength is a sine wavelength on their diagrams, it doesn't exist. What is causing the fringes is not sine wavelengths, it is the velocity of spins with given radii. The only "wavelength" involved is the spin radius, and that isn't what they mean by wavelength. The radius of the photon never enters current equations. How could it when modern physicists believe the photon is a point particle?

To say this in another way, even interferometry and laser mixing require assumptions and math to get a wavelength. We can't just lay a ruler on the data and get the wavelength of the light. The data isn't a direct measurement of the photon. It is a result of the photon interacting with the machine or other photons. All our measurements of the photon are **indirect** measurements, and since indirect measurements require math and field assumptions, they are prone to error. That is what is happening here. The equations and assumptions are wrong, so the numbers out are all wrong.

To be specific, it has always been assumed that shorter wavelength light will be diverted or bent more by prisms and other diffractors and refractors (including interferometers) *because it has a short wavelength.* It turns out this is false. As I show in my prism analysis, light isn't bent at all. The spectrum is created by the charge field "pushing" red light more than blue, and this is true in diffraction just as in refraction. Because red is smaller, it is more easily pushed by the charge field. Violet is actually diverted or bent *the least*, but the diagrams are misread. This is where the reversal takes place. This is where the current theory is upside down. This false assumption had caused all physicists since Newton to assign wavelengths upside down. The charts are backwards.

Part 6: the Interferometer

Which brings us to the central analysis of this paper. Rather than analyze the prism again, let us look at the interferometer, since it has given us these current wavelengths.



According to current theory, the interferometer splits a beam of light into two beams, delays one with respect to the other, and then recombines them to get interference. Problem is, it is assumed that the interference is an interference of wavelengths, when it isn't. I have just shown you that the interference must be physically caused by spin interaction, not interference of wavelengths. Physically, wavelengths can't affect one another. How can one length affect another length? No, only motions can interact or interfere, and the motion interacting here is photon spin.

The basic starting equation of the interferometer is $\lambda = 2d/m$, where m is the number of fringes and 2d is the distance between 2 point sources of light observed. Not only is that the basic starting equation, that is practically all the math involved! Hopefully you can see just from that one equation that physicists are assuming that the fringes are being caused by a wavelength directly. To measure the wavelength, they simply measure the fringes. That is naïve in the extreme. It is naïve because you see once again that physicists have always just *assumed* that wavelengths are interfering. This despite the fact that the wavelength of light has never been assigned to anything. It is assigned to a sine wave on a diagram, *but then the diagram is assigned to nothing*. If that assumption is wrong, then this equation is wrong. I have shown that both the assumption and the equation are indeed wrong. I will now prove it beyond any doubt.

What is actually happening in the interferometer is that the light is being split into two parts. One part is forced to take a path slightly longer than the other, then the paths are recombined. Currently this is said to cause a wavelength discrepancy, which shows up as interference or fringes. But what is happening is that the spins are being thrown off, so that when the light is recombined, half of it is incoherent regarding spin. If we treat the photons as Feynman did—as little clocks—half the clocks will be pointing to 2 and half will be pointing to 3, say. They will still have the same speed and energy, but they will be out of spin phase. This solves this problem the same way it solved the partial reflection problem, because it explains the mechanics beneath Feynman's sumovers. It matters where in its spin cycle the photon is, because the photon is composed of stacked spins. By knowing where in its spin cycle the photon is, we can tell where the body of the photon is inside the spins. Consult Chris Wheeler's animation again, and you can see that the body of the photon is never at the center of the spins. This explains why being at 2 in the spin cycle is not the same as being at 3. The stacked spins give the photon a varying momentum. In other words, if the photon body is forward of center in collision, the photon will act very slightly differently than if the photon body is behind center.

To visualize the interferometer problem, imagine all the photons recombined into one beam after being reflected by the central mirror, traveling side by side once more as they approach the detector at the end. As they move along, they constantly jostle one another. Since the photons don't all hit the same spot on the mirror, they don't have precisely the same trajectory, and some variation is the result. So they do not travel in perfectly parallel trajectories. In short, they jostle. Well, when they collide side-to-side, the outer spins meet. This meeting of spins is what creates what we call interference. The spins can damp or augment, creating what we call peaks and troughs. And the distance between peaks and troughs in an interferometer will be determined by the relative difference in energy of the spins. If we have photons with a fast spin rate (or a higher spin frequency), larger gaps in the data will be produced. Larger fringe gaps will be the result.

Just think about it. Say we have two sources of light. Source A and source B. In the first, the photons are spinning at a rate of 4. In the second, they are spinning at a rate of 2. Now we put the first light through the interferometer. Say the interferometer creates a path difference of 25% (we are using fat round numbers here, obviously). On one path, Aa, we will say the photons happen to arrive at the detector just as they were emitted, so they are at 4. On the other path, Ab, the photons are 25% off their spin rate, so they are at 3. The difference is 1. Now we put the light from source B through the same interferometer, still set at 25%. On path Ba, the photons arrive unphased, and so they are at 2. The phased photons Bb arrive at the detector at 1.5. The difference is .5. In other words, the interferometer found a fringe of 1 with the first and .5 with the second. By current theory, they would assign the first double the wavelength of the second. Is that correct? No. I hope you can see that they just assigned the larger wavelength to the higher spin frequency. **This is where the switch is made.**

Just to be clear, in current theory, larger wavelength goes with lower frequency. But that isn't what we just found. Larger fringe gaps are therefore *not* caused by larger wavelengths. They are caused by greater spin velocities. And greater spin velocities belong to smaller photons. And smaller photons are less energetic.

[A clever reader might say, "Your quick math of the photons going through the interferometer is too quick for me! I think you just 'fudged' us, as you say. Your 4-cycle photons must be smaller, according to your own theory. If they have half the radius of the 2-cycle photons, then everything evens out, doesn't it? Half the radius means half the circumference; so, as a matter of distance, 1 for the first set of photons is the same as .5 for the second set. It looks to me like both sets of photons would have the same fringe. According to your theory, *all* photons should have the same fringe." I see what this reader is getting at, but it isn't correct. And I agree my math was a bit quick, which is why I am adding this. What my reader is forgetting is that all photons move c, no matter how fast they are spinning. So the radius doesn't come into it here in that way. For his analysis to be correct, we would have to somehow add the spin distance traveled (the circumference) to the x-distance traveled due to c. This would create a sort of wavelength from the spin frequency alone, and that actual length would be causing the fringes. That isn't what is happening, as I have shown. No wavelength is being created. This is because the spin speed is *inside* c, not on top of c. If we added spin speed to c, different photons would go different speeds. I don't want that anymore than you do. In other words, the gap the interferometer is measuring isn't a distance gap. It is a spin phase gap. Because the smaller photons are spinning faster *relative to c*, they create a larger gap in the same time. The smaller photons are more out of phase than the larger ones, so they create bigger gaps in the data. That is all there is to it.

Look at it this way: since my reader wants to talk of spin speed rather than frequency (which is only fair, considering what I said above), let us say that both sets of photons [A and B] have the same tangential velocity c. But rather than add that velocity to c, we remember that the spin is inside c. This means that whatever the spin speed is, we have to integrate it into c. Since a smaller photon is making more revolutions per second, it not only has a higher frequency, it has a higher speed relative to c. Same *tangential* velocity as other photons, *but a higher spin speed relative to c*. Or, to put it another way, a higher angular speed. It covers a greater angle per second, or more degrees per second, than a larger photon. Either way you look at it, this higher spin speed will create bigger gaps in the interferometer.

What the interferometer is measuring is phase differences between the same photons, one slightly delayed. That isn't a distance, because the interferometer is not detecting the first set Aa and then the second Ab, finding a distance that way. No, the interferometer is detecting a gap between photons *arriving together.* The phase gap is between Ab and some photons just behind Aa. Ab and Aa can't jostle, because they aren't at the same place in the wavetrain. So, again, the interferometer isn't measuring a length between the two like that. You can't measure a distance gap from photons arriving together. With the photons arriving together, the gap is a phase gap, caused by spin. The faster the spin speed, the bigger the gap. Higher speed, same time: bigger phase gap. Here is where your distance comes in, and it is an angular distance. In the same time, a greater angular speed will create a greater angle. That angle is the gap. It is a distance, but not a linear distance like the interferometer is creating between fringes. The fringes are a result of the angular gap I just showed you, which is neither a wavelength nor what we now call a frequency. It is phase gap, like the gap between the number 12 and the number 3 on a clock.

My reader will now say, "I think I get it. The fringes are caused by the jostling photons, which create interference. But won't that jostling create distance gaps that we could call wavelengths? Isn't that what the interferometer is doing: assigning the wavelength to that jostling?" Yes, that's exactly right. "And if so, what is wrong with that? What is wrong with assigning wavelength to this jostling caused by spin phases?" What is wrong is that it gives us the wrong frequency for the photons themselves. If we assign the wavelength to the interference in the jostling, then the frequency goes along with that wavelength. We make a sine wave out of that wavelength and then *manufacture* a frequency from that. But it isn't the right frequency. Or, it isn't the frequency the photons themselves have. It is upside-down to the frequency the photons themselves actually have, as I have shown. We think the photons have a low frequency when they have a high. This is important, because although the current variable assignments work well for many mundane and experimental uses, they have blocked our deeper understanding of the photon and therefore of light itself. We have to quit thinking of light as just an experimental entity. To advance theory, we must start thinking of light as a real entity, like other matter. Instead, we are beginning to think of matter more like we have historically thought of light: as an imaginary entity we can represent anyway we like, the less physical the better. Rather than move light from virtual to real, we have moved matter from real to virtual. This is not what I would call progress in physics.]

This means current theory is both right and wrong. What they are calling long wavelength photons are indeed less energetic photons. So they are right about the energies. But the less energetic photon does not have either a long wavelength or a low frequency. It has a high spin frequency and a small radius. It has nothing that we would call a wavelength, since no sine wave is created in the field. If we want to assign a wavelength, we have to transform the radius into a wavelength, as I do below.

You will say, "I still don't understand how a smaller, less energetic photon can have a higher frequency." It is all based on the radius. The redder photon has a smaller radius. This gives it a smaller circumference. If the spin velocity is c, then the time of one rotation gives us a frequency. That frequency must be greater than a photon with a larger radius. Hence, more spin velocity, less energy. Just the opposite of what we are taught.

If that still isn't clear, look at two planets in orbit. Give them the same local velocity v. If planet b has a greater orbital radius than planet a, its period will be greater. Since frequency is 1/period, its frequency will be less. It will return to the same spot less often.

This is why I said above that we needed a radius in the wave equations. $c = \lambda\upsilon$ doesn't give us enough to solve this problem. And once we put the radius in the equations, the other variables flip.

Part 7: the Ether

Before I correct the equations, let me pause for a moment to summarize what we have found so far. We have found that less energetic photons are smaller, have a higher spin rate, and have nothing that we would currently call a wavelength. No sine wave or field wave is produced. The gaps in the interferometer data are not indications of wavelengths. They are lengths in the data only, not lengths that belong to the photons or the light. The lengths in the data should be interpreted as spin differentials, not wavelengths.

All this is much more logical than what we have been told. In my new theory, less energetic photons are smaller, as they should be. As the photon gains energy, it also gains radius, which is also logical. And assigning wavelength to the photon radius—rather than to some manufactured sine wave—is also much more satisfying as theory. How could a greater radius cause a smaller wavelength?

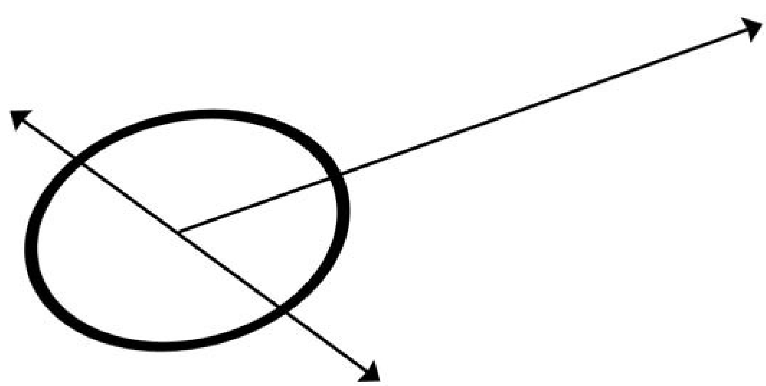
In this way, we have also resolved contradictions in current theory, regarding the ether. Current theory has thrown out the ether as untenable, teaching us that light does not travel via an ether. And yet everytime it draws light as a sine wave, it implies motion relative to an ether. A sine wave is a field wave or ether wave. It requires a background. But since the wave of light is created by the spin of each photon, no ether is required. Mainstream theory was correct that no field was required to explain either the motion or the wave of light, and yet they kept drawing and explaining light as a field wave. No more.

Light doesn't travel *via* an ether, light *is* the ether. Light was never an analogue to sound, because sound is the motion of a field. Light is not the motion of a field. The wave of light is not a pattern in a field, it is the spin of each photon. Physicists must learn the difference.

What this means is that we should ditch the whole sine wave diagram of light. It is just a method of confusion. Now that we have unwound the whole problem, it is much clearer and more efficient to assign the variables to the photon than to the sine wave. In which case the variable assignments are as I have assigned them in previous papers: the wavelength to the spin radius and the frequency to the spin velocity. Once we make the switch, we have to change all the charts and equations. Ultraviolet now has a *longer* local wavelength than infrared. An ultraviolet photon is *bigger* than an infrared photon, which is why it is more energetic. And it has a smaller local frequency. As we increase energy, it is wavelength (photon radius) that increases and frequency that decreases.

Part 8: the Math

Now let's do the math. Since we have jettisoned the sine wavelength, we are free to re-assign the variable λ to the radius. But rather than do that, let us assign it to how *we* would measure the radius from our vantage. In other words, we will do a sort of Relativity transform on the radius, to find out how we would measure it at our scale and speed. Since light is going c relative to us, c is the only scaler we need. But since light has both a spin motion and a linear motion, we will need c twice in the transform. If r is taken as a simple length, then that length is going to be stretched out by the motions of the photon relative to us. To see what I mean, you have to go back to the Wiki animation I borrowed, the one where the spin is being turned into a sine wave. That animation doesn't match our photon, because we need to put our photon's spin in the same plane as its linear motion. We need to lay the circle down and then move it along the x-axis, to even begin to get the right mechanics. So if we have to try to diagram this, we diagram it this way instead:



As you see, the circle doesn't travel standing up, as in the Wiki diagram. In my diagram, we put the spin radius directly in the line of motion, which must fully integrate r into all the energy equations.

It is clear that the radius will be stretched out by the linear motion of the photon, but it will also be stretched out by the spin motion. Why? The simplest way to explain it is to remind you that we are using these variables like r and λ to give us an energy of the photon. That is what we really need. We have existed with the wrong wavelengths for years, and it hasn't mattered in most situations. But we need the energy equations to work. Well, in the equations we need, radius is standing for a sort of baseline energy. The circumference then has an energy relative to that radius, and the linear motion has an energy relative to r as well. So what we are doing here with this Relativity transform is transforming the local energy of the photon into the energy we measure. We are just letting the lengths stand for the energies, you see. And while the photon is gaining kinetic energy from its speed relative to us, c, it is also gaining kinetic energy from its spin. It is spinning *while* it is moving linearly, so we have to integrate the motions. We do that as I have done it in previous photon papers. Using my new kinematic equations, we know that the circumference is 8 times the radius. If we assume a point on the outer spin is going c, then we can find a total distance traveled in a given time. And that point also has a linear velocity c relative to us. So the total transform is just $8c^2$. If the radius is taken as a local wavelength, then we will experience that wavelength as $8r_\gamma c^2$.

Some will balk here, I predict, since they will say I just forbade adding the spin distance to the linear distance above. But I didn't forbid it, I just said that isn't what is happening in the interferometer. You can't add the spin distance to c in that analysis, because that isn't what is happening. Light doesn't work that way, and it would contradict data. Photons don't travel at c+spin rate. But here, we aren't doing anything like that. We aren't adding anything to c. We are using c^2 as a Relativity transform, which is completely different.

Anyway, by simple substitution, the equation $E = h\upsilon$ becomes $E = hc/8r_\gamma c^2$. But we can fine-tune and simplify that as well. We know that equation is in the wrong form, because the energy should be directly proportional to the radius. In that equation, it is inversely proportional.

Let me pause to underline that. Read it again closely: *the energy should be directly proportional to the radius.* Simple logic. A larger particle at the same speed must have more energy, right? But, as you see, the current equation is upside-down to that logic. If we insert a radius into the current equation, the radius is in the denominator! So, according to the current equation a larger photon would have a smaller energy. The current equation can't be right.

Added to all the other problems we have uncovered, we see that Planck's constant is skewing the equation. We should have expected this, because Planck's constant is just a fudge factor. Since we have gotten rid of the fudge, we don't need the factor anymore. If we melt all the fudge out of the equation, we get

$$E_\gamma = 2r_\gamma\sqrt{c}$$

How did I get that? I just put the radius in the numerator where I knew it had to be, then filled in the rest to match current numbers, stay mechanical, and follow reason. If we use $r_\gamma = 2.74 \times 10^{-24}$m (see photon2.html for the derivation of that radius), that equation differs from $E = hc/8r_\gamma c^2$ by only 1.06, which is represented by this term: $\sqrt[4]{4/\pi}$). We need that term because the current derivation for Planck's constant uses π when it shouldn't. That is our transform to rectify the equation, taking π out of it. I have had to use that equation before to rectify quantum equations (see my paper on Stefan-Boltzmann and on the unified field), so when I saw the number 1.06, I knew immediately where it was coming from. It is the difference between 4 and π, at the fourth root. It is caused by treating quantum equations as static equations, when they are kinematic equations. In kinematic equations, we replace π with 4. This means that the standing photon energy equation with h in it is wrong by 6%. I have shown that Einstein's field equations are 4% wrong in the field of the Sun, and now it turns out that the photon energy is off by 6%.* They assure us these equations are correct to within a hair, but they never are. They are pushed into a ballpark by data, and the rest is just bluster.

We can now write photon mass and radius as functions of one another:

$E_\gamma = 2r_\gamma\sqrt{c} = m_\gamma c^2$
$m_\gamma = 2r_\gamma/c\sqrt{c}$
$\lambda = 8E(r_\gamma/m_\gamma) = E(C_\gamma/m_\gamma)$ C is circumference of the photon (z-spin)
$m_\gamma = E(C_\gamma/\lambda)$

So I have just shown where Planck's constant comes from, and dissolved it as well. We don't need it anymore. We can now get a photon energy straight from its radius or mass, or vice versa. Planck's constant was nothing more than mathematical residue from writing the energy in terms of the sine wave variables instead of the real variables of the photon like radius.

Conclusion: Correcting these longstanding errors will allow us a deeper understanding of the photon, and thereby all quantum interactions. In previous papers, I have shown that this error has caused many problems, and the reversal of many explanations. For example, the current explanation of the blue sky using scattering and the Raleigh equations reverses the mechanics, due mainly to this problem. Colorimetry is also affected, as well as explanations of the prism, of diffraction, and indeed of just about every problem in optics or QED. Three centuries of wave mechanics will have to be rewritten as spin mechanics.

You can now go to my newest paper on light, which is commentary on this paper, plus an explanation of what causes the 6% error in current equations.

*This is one reason the mainstream uses both Planck's constant and Dirac's constant. Because their equations are all messed up, they need both constants to help them fudge answers in a variety of problems.