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The Third Wave
Part 1X

Why the Sun and Moon have the same Optical Size
Proof of my Theory

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In http://www.geocities.com/mileswmathis/ele.html, I have shown experimental proof for my theory of gravity, using the apparent bending of starlight by the outer planets. Here I will show an even simpler and closer piece of visual evidence for my theory. This piece of evidence is not new evidence that I have discovered; it is very old evidence that has never been explained. That evidence is the well-known equivalence of the optical size of the Sun and Moon, as seen from the Earth. This equivalence is what causes the spectacular solar eclipses, where the Moon covers the Sun precisely.

Many people in history have wondered why this is so, and some of them have postulated that it is a direct outcome of the mechanics involved. Using current theory, however, the mechanics cannot be explained, and the standard model now proposes that the optical size equivalence is just a coincidence.

I take this as one of the great failures of physics and kinematics at this point in history. We are told that we are now a stone's throw from knowing everything about the mechanics of the universe (see Stephen Hawking) and yet we still dismiss one of the primary visual facts of the nearest celestial bodies as coincidence. It is not coincidence. In fact it is extremely easy to explain once your have the correct "force fields" in place.

I have already explained my fundamental orbital mechanics as the compound of two fields, the gravitational field and the E/M field. Historically, orbital mechanics and all of physics have joined the two together, ignoring the E/M field with celestial bodies. The standard model assumes that there is only one field, the gravitational field, and it attempts to explain all motions using that one field.

But I have shown that orbits cannot be explained in this way, neither circular nor elliptical orbits. The standard model requires celestial bodies to vary their innate motion or tangential velocity in order to correct complex orbits (with more than two bodies involved) and celestial bodies cannot do this. I have shown that the differentials betray this fatal problem, and I have shown that summing the orbit or importing General Relativity does nothing to solve the problem.

I have solved it with two postulates. 1) Gravity is not a pulling force (it is also not a pushing force). Instead, gravity is a real motion outward of all bodies, celestial and quantum, in three dimensions. It is an expansion. Mathematically I achieved this expansion by taking Einstein's equivalence postulate literally. My postulate is the same as Einstein's; he applied it to the space, creating curvature; I apply it to the matter, creating expansion. This makes the gravitational field only an apparent field. There is no real force and no real field. The apparent field is an acceleration field, not a force field. This is also true of the current gravitational field, but I make this fact more transparent. The standard model gravitational field is an acceleration field, and everybody knows that. 2) The E/M field is a simple bombarding field and always creates a repulsion. There is no negative charge, only positive charge. There are no attractions; only repulsions caused by real bombardment by real physical radiation.

I have shown that these two fields, along with innate motion (tangential velocity), can explain orbits where the standard model could not. These two fields also do away with all mysticism in mechanics, allowing us to dispense with force at a distance, field lines, messenger particles, and all other non-mechanical ideas. All kinematics is explained with motion and collision, a true "pool ball" mechanics.

Any cursory analysis will show how this would solve the Sun/Moon equivalence problem. I hardly think I even need to do much math. To solve, all I must do is remind you of a couple of simple facts. First, as I said above, I have shown that what we now call the gravitational field is a compound field. It is not one field, but two. In my theory, we now have a gravitational pseudo-field caused by expansion. This is what I call the gravitational field (for the sake of simplicity) but mathematically it is the standard-model gravitational field minus the E/M field. The E/M field has been invisible to the standard model, so they do not see that it must be treated separately. Second, once we separate the two fields, we find that the gravitational field is dependent only on the radius of the expanding object. All the mass and density considerations we then give to the E/M field. More density causes more E/M radiation, so measurements of density affect only the E/M field strength. Density has nothing to do with gravity. Density is important in standard-model gravity only because standard-model gravity includes the E/M field, without knowing it.

We can see this if we look at Newton's gravitational equation. It should have been clear that Newton's equation is a compound equation—except that no one has looked hard at that equation in at least a century. Since Einstein took over gravitational math, that equation has been buried. It is used only in high-school textbooks. Everywhere else it is a dinosaur. But one of the first questions that physicists should have asked about that equation (and some of them did, long ago) is why the masses are multiplied rather than added. You have a force equation, but there is no mention of accelerations there. Only two masses and a distance. Since the masses are the cause of the force, by definition, it is unclear how you can have more force than you have mass. Your force comes directly from your mass, but we are not adding mass to find the total mass involved. We are multiplying. That is very strange.

It is explained by the fact that Newton's equation is a condensation—a combination—of two different force fields. Newton's equation expresses them both at the same time, although he did not see that and no one has seen it since. The reason you multiply the masses is that if you multiply masses while you have a distance in the denominator, you achieve a density. Newton's equation includes density. But not the density of the "gravitating" objects; the density of the entire field that includes them. You are calculating the density of the radiation field, the E/M field, without knowing it! Given a mass and a distance from that mass, you are automatically given an E/M field strength at that distance, since that is precisely how the field strength is calculated.

Let me put it another way. If you are given an expanding object that is radiating smaller objects and you want to calculate the total apparent force on any second object that wanders into that field, you begin by creating an equation for the apparent attraction. This equation is just one variable, the straight-line acceleration between the two bodies, caused by the expansion. It is not a force, it is an acceleration. This is true of standard-model gravity as well. Standard-model gravity is not a force, it is an acceleration. Just look at the dimensions of g in current theory.

Next you calculate the repulsive force caused by the radiation. This is a real force and it is caused by direct collision. To calculate it, you need to know the density of your field. In other words, you need to know how many of these radiated smaller objects are impacting the second object, and how much they weigh. The amount of radiation is directly determined by the radiating object. The more atoms it contains, the more radiation it will be emitting, since the radiation comes right out of the atoms directly. We already know that. A more massive object will create a more massive field, since the field is a direct extension of the object.

Once you have that equation, you combine it with your acceleration, and you have a total field. The acceleration will cause an apparent attraction; the E/M field will cause a real repulsion. The total field is the compound or vector addition of the two.

Newton's equation *is* that compound equation. That is precisely why it gives you a density. A strict gravitational equation shouldn't need a density, since gravity is not dependent on density. In both my theory and the standard model, gravity is supposed to be dependent on mass alone. That is what current theory tells us, in its definitions. But the math tells us something different. Newton's equation tells us that density is important, and so we multiply masses. But, as I have shown, density can only be important if you are including a radiation field. And Newton's radiation field must be a repulsive field, due to the way it combines with the acceleration. It cannot be a graviton field.

Now we can go ahead and explain the optical equivalence of Sun and Moon. Those of you who have fully understood what I have said up to now will already see where this is going. It is that easy. But I will continue. The Sun and Moon are unique in that they are the only two objects in the universe that are in equilibrium with the Earth. By that I mean that they are always (approximately) the same distance away. An orbit is a special sort of equilibrium, and the Earth is orbiting one and being orbited by the other. This means that our three motions (gravitational acceleration, E/M repulsion, tangential velocity) are in equilibrium. Because there is equilibrium, there is no resultant motion toward or away. The average radii of the two orbits are (nearly) stable.

Now, since the Earth has only one acceleration (its rate of expansion is a fixed number, the same relative to all bodies), it is accelerating toward the Moon at the same speed it is accelerating toward the Sun. You will say that this can't be true, since the Earth is being attracted to the Sun much more than to the Moon. But rather than get into a long discussion along those lines, let me just say that I am talking about someone who is measuring from the Earth. We are not looking at the solar system from a god's-eye view, in this case; we are looking from the Earth. That is where we ***see*** both the Sun and the Moon. That is where the optical equivalence is true. The Sun and Moon always look the same size from the Earth and from nowhere else.[1] Given that, and given my mechanics, what I said before is strictly true. The Earth is accelerating toward all objects at the same rate.

If it is not approaching those objects, it must be because the other motions are preventing it. The Earth is not approaching the Moon or the Sun. The average distance is constant. Therefore, the Sun and Moon must be repulsing the Earth in the same amount.

You will say it is the orbital speed that balances the equation, but the orbital speed can't do it alone. I am not denying that the orbital speed enters the equation in a big way. I am simply saying that it can't do the entire job. Gravity and orbital speed can't create a stable equilibrium, as I have shown exhaustively elsewhere. They can create only an instantaneous balance, a balance over one differential. But they cannot possibly create the celestial motions we see, which are near-equilibrium over long periods and correctable.

Let us ignore for a moment the orbital speed and tangential velocity and look only at the other two "forces." If the Earth is accelerating toward the Sun and Moon at the same rate, from its own perspective, then the Sun and Moon must be repulsing it with the same power. This is why both distances are in equilibrium. Now, if the repulsing force is caused by bombardment, and the force depends on the density, then it is very easy to see that two objects with the same optical size and the same density would repel the Earth to the same degree. Provided that the Sun and Moon both radiate the same E/M field, made up of the same sub-particles, the field density at the Earth must be the same.

Some will say, "But the Sun is a lot further away, so even if the Sun and Moon had the same local density, the Sun's radiation field would disperse spherically much more than the Moon's." Not true. At first analysis, it seems to be true, but you must look more closely. The radiation field must be treated as if it is emitted from the surface of the radiating object. It is true that much radiation comes from within the object, and if you do the full equations you are summing radiation all the way down to the center of the object. But you don't just sum energy; you have to sum collisions as well. A radiation field emanating from a large object encounters physical resistance until it clears the physical shell of the object, and this resistance will directionalize it. You don't have to study the math or the theory in depth; it is a common-sense proposal, one that completely adheres to all ballistics and pool ball mechanics. As with any such field, a summation will create major field lines that leave the object radially. This is assumed by my questioner above. This questioner argued that the field would disperse with distance, and he did so because radial field lines get more distance between them with more distance from the object.

But if we assume that the summation of the field creates radial field lines—as if the field is created from the surface—then we must look at the curvature of the surface. As you know, the surface of the Sun has much less curvature than the surface of the Moon. It is a bigger sphere, therefore less curvature. So, all you have to do is take the field as it is encountered by the Earth and work backwards. You take the E/M sub-particles that reach the Earth from the Sun and go back and see where they were emitted. You follow that triangle back to the Sun. What you find is that they were emitted by a patch on the surface of the Sun that curves very little, compared to the Moon. Because it curves very little, radial summed field lines emitted from that patch will not disperse as quickly as field lines emitted radially by a patch on the Moon. Due to the pretty simple math involved, two objects with the same density and same optical size will create the same field densities at the distances where they look the same size. You can do that math, but I think most people will see my point without it. All I have to do is state the obvious, and then it becomes obvious.

This means that all objects that the Earth is orbiting or being orbited by would be expected to look the same size, provided they have the same density. The balancing of the gravitational field and E/M field tends to push all equilibrium states, orbits and orbiting, into optical equality. It would appear that even objects with different densities are pushed into this optical equality, since the Sun and Moon are not thought to have the same densities. The third variable in this equation, the tangential velocity, appears to make up the density difference, by acting against the gravitational acceleration. We already knew that, since it has always been accepted that the tangential velocity offset the acceleration of gravity. We just thought up to now that the innate motion of the orbiter *completely* offset the acceleration, creating a simple two-variable balance. I have shown that this is false. It is a three-variable balance, one that tends to create optical equality based on the mechanics alone.

This also answers those who say that the E/M field is not nearly strong enough to repulse gravitational objects—that it cannot match gravity at the macro-level. Well, I am not proposing that it does. I am proposing only that it is one of three motions that balance. Both the E/M field and the tangential velocity are arrayed against gravity, in a vector sense, and I admit that the tangential velocity is a factor. But the E/M field is a very real player, and without it the equation could not balance or act as we see it acting in the solar system and the universe.

Of course the next question that is begged is why, if the densities are different, does the orbital velocity[2] tend to vary so that the optical equivalence is kept? The question can be restated as, "Why does an orbiter travel faster around a less dense object?" Given my mechanics, that is also easy to answer. It has to travel faster because that is where the equilibrium is. We have asked the question upside down, since the object does not speed up or slow down to suit an orbit. It has an innate velocity, and that velocity determines the orbital radius, given the densities of the orbiter and the central body. A body will settle into an orbit where the three motions balance. A less dense central object repels it less, so it settles lower. This makes the central object look bigger from the orbiter. This is what would happen if the Sun suddenly became less dense. The Earth would settle lower and the Sun would look bigger.

You may think this is just the opposite of the standard model, since you would need a denser Sun to pull the Earth closer. But that is only partially true. Using the standard model, the Earth would indeed be pulled closer by a denser Sun—since if we kept the size of the Sun the same, the mass would also be greater—but the Earth would not "settle" anywhere. It would crash into the Sun. The standard model is not correctable. Any change in the density of the Sun would make the Earth's orbit fail one way or another. But you see that we can change the density of the Sun with my mechanics and it does not doom the orbit. The Earth just goes to another orbital distance where the equilibrium of the three motions can be maintained.

I hope you will remember from http://www.geocities.com/mileswmathis/cm.html. Celestial Mechanics paper, where I said that Newton's and Kepler's mechanics were inside out, compared to the boy whirling a ball on a string. This is an example of that. Using the standard model, if we make the Sun denser and keep the velocity of the Earth the same, we have to move the Earth to a greater orbital radius (but we can't do that because the Earth cannot make the move on its own). By my model, a less dense Sun moves the Earth closer, and the Earth can make that move without being self-propelled. It simply falls into the correct orbital radius.

But what would happen to the Moon with a less dense Sun, using my mechanics? To keep the same optical size as the Sun, the Moon has to move closer to the Earth. Why would it do that? It could only do that if it slowed down, since we are imagining the Moon and Earth staying the same density. Why would it slow down? Obviously it is being slowed by the Sun's E/M radiation. That is the only thing that has changed in the equation. But we have a less dense Sun. How could a less dense Sun cause a greater force? You will say, yes, we are closer to it, but even so its force should be the same as before. It *must* be the same as before, since that is why the Earth chose that level to settle into. We are re-creating the original balance. But you are missing one critical thing, if you say that. Yes, the radial force will be the same as before. The Earth has the same tangential velocity as before and it has the same acceleration toward all objects as before, therefore the E/M force from the Sun must be the same in order to create the original equilibrium. *However*, the Moon is encountering both the radial force and the tangential force (the Earth is too, but it doesn't affect this part of the equation). What I mean is, about half the time in its orbit of the Earth, the Moon is moving sideways through the Sun's E/M field. Due to the way a spherical field works, tangential forces don't vary in the same way as radial forces. It is easy to intuit without a pageful of math. Just think of a sphere and then think of a large number of field lines coming out of it radially, like spikes out of a pufferfish. The number of those lines you would hit per square inch, say, stands for the force you would feel. But you can hit those lines either point-on, or sideways. In other words, you could approach the pufferfish directly and get hit by x-number of spikes, hitting the pointy ends of the spikes. Or you could be a tiny fish swimming by sideways, and you could get caught in the forest of spikes. You wouldn't get stabbed by any spike; rather, you would be seeing the spikes like trees, and you would have to swim around the trees to avoid a collision. The first example is the radial force, the straight repulsion by the field proper. The second example is the tangential force: it is like getting caught in cross traffic. The difference is also like the difference between a head-on collision and getting T-boned. The little fish has lots of cross traffic to dodge.

Notice that I am not using the magnetic field here. I am not using two perpendicular fields. I am explaining it by straight pool ball mechanics. It doesn't matter which direction the traffic is going, when you have to cross a street. Traffic in either direction can impede your progress. This is why it doesn't matter if the Moon is going left to right or right to left. Both motions will be impeded by the motion of E/M subparticles moving from the Sun to the Earth. [3]

Now, if you think about the way the two situations differ, you quickly see that the closer the little fish gets to the big pufferfish, the denser the forest gets. The radial lines are getting closer very quickly. They are also getting closer if you are moving directly at the pufferfish, but the two equations are not the same. The radial density equation is the same as the surface area equation, since you are just going from one surface area to a slightly smaller one. But the tangential density equation varies nearly to an additional exponent, since an object moving in that direction will be encountering the same change in each of two dimensions.

You can also think of it this way. Once again it has to do with curvature. In both cases I have admitted that the main radial field is the same, whether we take the original case where the Earth was farther from the normal Sun, or the second case where the Earth is closer to a less dense Sun. It must be to continue to balance the equation. But as we move nearer the Sun—whatever density it is—we are moving into a field with more curvature. A smaller spherical field has more curvature, no matter what its radial density is. Well, this curvature doesn't affect the radial field; in the radial field we are only concerned with the number of field lines that hit us, and we have kept that number the same. But the curvature affects the tangential field a lot, since it squashes it. That means an object moving tangentially will encounter more field lines. More field lines means more collisions, and that means greater slowing. Whenever the Moon is moving sideways to the field of the Sun, it is being slowed. If it moves nearer the Sun, it is slowed more. And the slowing from this tangential field increases more quickly than the radial field.

So if we take a less dense Sun, move the Earth nearer to it to balance the equation, the Moon will not be feeling the same forces as before. The motion of the Moon toward or away from the Sun will be the same as before, since any addition will be offset in the other direction. But when the Moon is moving sideways to the Sun, it will be slowed more than it was at a higher orbit, even with a less dense Sun. This will cause it to settle nearer the Earth, and look larger, keeping the optical equality.

Once again, I point out that using the standard model, the Moon could not do this. If the Moon slowed down for any reason, it would crash into the Earth. If it speeded up for any reason, it would escape orbit. The standard model does not create a balance of opposing forces and so it is not correctable.

This also explains why the Moon has moved from an equatorial orbit into an orbit in the ecliptic. It is nearer the Sun than any other Moon in the solar system, so that it moves through a much stronger solar E/M field. This field directionalizes the motion of the Moon, forcing the Moon to align to the Sun as well as to the Earth. This is not because the Sun's E/M field is stronger than the Earth's, from the Moon; it is because, in its current orbit, the Moon is electrically aligned to both. The equatorial plane is pretty much immaterial when talking of the E/M field as we are talking of it. The E/M field is expressed spherically, not equatorially. The spin of the Earth doesn't have much to do with it, since the E/M field as a whole is generated by the protons in the Earth, not by the Earth as a macro-body. The spin of the Earth does cause lots of other electrical and magnetic phenomena, of course. But the Moon is not directionalized by these phenomena. Affected, yes; directionalized, no.

Critics will have lots of questions for me at this point.

1) I have said that an orbiter's innate motion cannot vary, since it is not self-propelled. Then I claim that my orbiter will change speed to balance the equation—as when we decrease the density, for instance. Haven't I contradicted myself? >No. Once again, I must remind you of the difference between tangential velocity and orbital velocity. Orbital velocity is the curved "speed" in orbit. In other papers I have shown that it isn't really a speed or a velocity, but we still call it that, and I continue to call it that in this paper. This "speed" is the vector addition of two straight-line motions: the tangential velocity and the centripetal acceleration. Now, the tangential velocity stands for the innate motion, and it doesn't vary unless an outside force acts on it. It can't show any variance on its own, just to suit summed orbits, and I don't allow it to vary that way in my theory above. In the paper above we have two possible variances. The orbital speed can vary, and it varies by varying the centripetal acceleration. In my theory, the centripetal acceleration is now a compound: it is the gravitational acceleration minus the E/M acceleration. So you can see that this is exactly where the dependence is in the three-motion equation I have invented. Any change in the density of the central object will cause a change in the E/M field strength, and that will automatically cause a change in the compound centripetal acceleration. And

that change will automatically give us a new orbital speed, since the compound centripetal acceleration is part of the orbital speed. It all fits together perfectly, creating a balance where all the dependencies are explicit. The second way we can have variance is if the innate motion is changed by an outside force, and we explicitly show this outside force in the theory. That is what is happening when the Moon is slowed by the Sun's field. In that case, the tangential velocity really is changing. But it is not changing just to suit a summed orbit, as in the standard model. It is changing for a mechanical reason, one that I was compelled to explain in great detail, as you saw.

2) Why don't man-made satellites tend toward optical equality like this? >Because to do so they would have to orbit within the atmosphere. Engineers take them beyond the atmosphere for frictional reasons, and beyond the atmosphere, they look very small. At those heights, the orbital speeds are not what one would call natural speeds, since the orbiter does not settle into orbit without major planning and calculations and corrections. In fact, left to themselves, man-made satellites do seek that natural lower level. That is why they crash into the atmosphere if they aren't tended. And that is why the earth doesn't have any tiny natural satellites orbiting with the man-made ones. Both meteors and space garbage are not in a stable equilibrium of all three motions, and so they enter the atmosphere—seeking optical equivalence to the Moon and Sun—and burn up.
3) Why don't all of Jupiter's moons look the same size from Jupiter? Why doesn't the Sun look the same size as all of Jupiter's moons, from Jupiter? >Are you sure that they don't? Better do some research before you start asking questions. Let's look at Mars and Phobos first. Remember that Phobos is smaller than the Moon and that the Sun looks smaller from Mars. The Sun is about 20' wide from Mars, and Phobos is about 10' wide. Already pretty close. But Phobos is moving closer to Mars very quickly (1.8m/century). The standard model believes that Phobos will eventually impact or break up at the Roche limit, but I say it won't because a more important limit is its optical equivalence. Once Phobos reaches the orbital radius of optical equivalence, the orbit will stabilize. It must because it will then be in equilibrium. [In another paper[4] I show that the Roche limit is false; but we should have already known that from Saturn's Pan and E-ring and Jupiter's Metis and Adrastea.] Mars' other moon Deimos makes this even more interesting. Deimos adds another 2.5' of angular diameter and it is also moving closer to Mars very quickly. I propose that we can add the angular diameter of the two moons, to achieve optical equivalence. This is because what we are measuring here is E/M influence, remember? So the two moons act as one in this equation. This means that Phobos doesn't need to achieve solo optical equivalence to the Sun; it only has to achieve a combined equivalence along with Deimos. If this is so, then we can move on to Jupiter, proposing that it is the sum of all the angular diameters of all the moons that must match the Sun. If there is no immediate match, then I propose that we can show that the moons will be in transition to those equilibrium states, moving nearer or farther away to achieve a summed equivalence. I will offer those numbers in an upcoming paper.
4) Why don't all the planets look the same size from the Sun? >Are you sure that they don't? Right off the top you find that Mercury, the Earth, and Saturn are

optically equivalent from the Sun. Another triplet of "coincidences", right? Of course there are major deviations with the other planets. But these may be orbits in transition. It is already thought that Venus is sorting through some fairly recent collisions, and of course we know that Jupiter and Mars were affected by the collisions that caused the asteroid belt. The Earth is a fairly old and simple equation, which is why I was able to gloss it without talking of many major outside influences. And it is highly suggestive that the most stable planets, historically, are the very ones that match my prediction.

In fact I find it strange that the Sun/Moon optical equivalence hasn't been pursued more hotly. Normally you would expect physics to try to explain such bald data, not ignore it as "coincidence". It seems like a pretty good piece of evidence to build a theory around, if you think about it. I didn't do that. I discovered later that it fit into my theory. But as I look at it, I am surprised that someone before me didn't use it as a first postulate. Meaning, it would make perfect scientific sense to assume that the equivalence was not coincidence, and then to build a mechanics around it. It is such a strong piece of visual data. Physics should have spent two hundred years trying to make gravitational mechanics fit the fact. It has spent longer on things that were much less certain and much less leading.

For those of you who haven't yet been convinced, I will soon publish a paper that explains in more detail how the solar system fits together. I will do the math and show exactly why specific planets and moons deviate from this optical equivalence and why they are all moving very quickly toward it. I will show you some more optical "coincidences" and also show you why others fail to materialize. But I have already given you the tools to do that yourself.

[1] At any given time, there are a lot of places where the Sun and Moon look the same size, but over an extended time, there is only one place from which they *always* look the same size—from the Earth. It is not an accident that the Earth permanently inhabits that slot.

[2] See "critic's question" number 1, above.

[3] E/M subparticles will also be moving from Earth to Sun, but by far the majority of traffic will be Sun to Earth, for obvious reasons.

[4] Upcoming paper on Phobos, the Roche limit, and so on. As a foretaste, I replace the braking effect of Mars' upper atmosphere with the braking effect of its E/M field, showing that it is exactly right for the secular deceleration of Phobos.