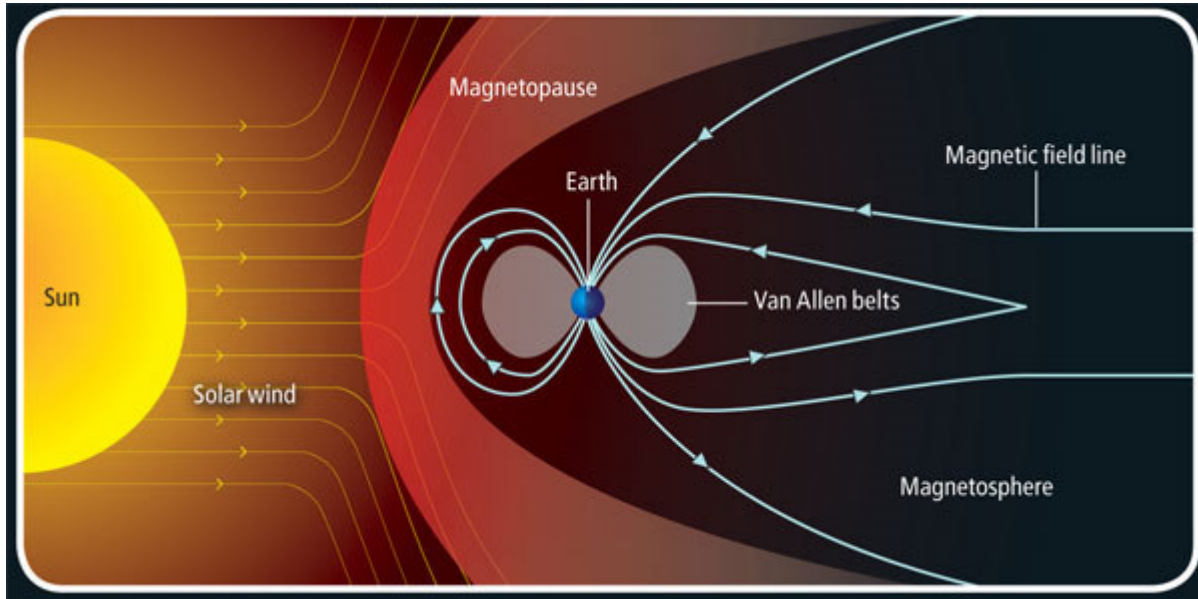


The Magnetopause calculated by the Unified Field

by Miles Mathis



Abstract: I will use my simple unified field to explain several anomalies in the action of the Solar Wind and in magnetospheric exclusion of ions. Using this same field, I will calculate, with simple math, the distance of the Earth's magnetopause (this has never been done). Then, using this same equation, I will predict a distance for the ionopause of Venus—a distance not yet known.

It has been found that the Solar Wind works differently with positive ions and negative ions.* Protons are accelerated by the Wind in an even manner, passing the Earth in numbers and at velocities that can be predicted from various models by the temperature of the corona. But electrons behave in an unpredictable manner, not being accelerated at the proper velocity. They are moving too slowly. They have also been found to be diverted by magnetic field lines, while the protons were not.

This phenomenon, though long known, has never been explained. The standard model cannot explain it because the dipole field of electromagnetism is supposed to be balanced. That is to say, the proton is not given more charge than the electron, or vice versa. The electron attracts the proton just as much as the proton attracts the electron. Given a field of potential like this, there is no way to explain the different behavior of negative charge and positive charge. According to the standard model, the solar system is nearly neutral as a whole, so ions are accelerated due to very limited field or no fields. In other words, they are not being accelerated by some long-range

potential between the Sun and outerspace, they are being accelerated by short-range potential differences in the outer layers of the Sun, or are being ejected directly from the interior as thermonuclear by-products. Other explanations are also advanced. But none can explain the data. If the ions are accelerated by charge, then the electrons should be going in opposite directions to the protons. If they are accelerated by mass, the electrons should be accelerated more, not less. The proton has more inertia, so it should resist acceleration better. Likewise if ions are ejected from the solar interior: electrons should be ejected at greater velocities, since they are smaller. Or, if they are both ejected near c , and are nearly equivalent due to the limit at c , then they should be nearly equal. In no case should the electron be accelerated less, or be more easily diverted.

But the plasma or electrical sun model can also not explain it. The only prominent competing theory of solar energy to attract any attention in the past half-decade has been the electrical model, which came (in twisted channels) from Velikovsky and plasma research. According to this theory, the Sun is a giant anode being fed energy from cathodes in the rest of the galaxy. But if this is so, then only the protons should be accelerated out from the Sun. The electrons should either never be ejected, or they should loop back immediately. This theory is also contradictory in the way it treats the Earth and the Solar Wind. According to Ralph Juergens (following Tesla), the Earth acts like a well of negative charge. As such, it should repel negative ions in the Solar Wind. Instead, we find that the Earth, via its magnetosphere, excludes both negative and positive ions. The E/M field, which is supposed to be field of potential in both the standard and plasma models, is not acting like a field of potential.

Both models use plasma to explain Solar Wind exclusion, but neither model is consistent. Let's look at how Wikipedia uses plasma to explain Solar Wind exclusion. On the page entitled "Magnetosphere", we are told of the Solar Wind that:

Its composition resembles that of the Sun—about 95% of the ions are protons, about 4% helium nuclei, with 1% of heavier matter... and enough electrons to keep charge neutrality.

See a problem there? You cannot maintain charge neutrality with 99% positive charge. That leaves less than 1% negative charge, and $<1\%$ cannot balance $>99\%$. *The electron and proton have equivalent charges, by the first postulate of modern theory.* Then we are told,

Physical reasons make it difficult for solar wind plasma with its embedded [interplanetary magnetic field] to mix with terrestrial plasma whose magnetic field has a different source. The two plasmas end up separated by a boundary, the magnetopause, and the Earth's plasma is confined to a cavity inside the flowing solar wind, the magnetosphere.

"Physical reasons." I will have to remember that next time someone asks me a question about mechanics. "Physical reasons," I will say. I am not questioning that plasmas may create these boundaries, I am pointing out that we require a mechanical explanation for it. An existential explanation will not do. "Because plasmas work like that" is not a mechanical explanation.

Since neither the standard model nor the plasma model has given us a satisfactory explanation for the electromagnetic action of the Solar Wind, I will offer a third model here, one that is far simpler and far more comprehensive.

In a series of other papers, I have shown that the Solar System is neither wholly gravitational, as the

standard model would have it, nor mainly electrical, as the plasma model would have it. Like all else in the universe, the Sun and its environs are driven by the unified field. I have shown that Newton's main gravitational equation milesmathis.com/g.html "<http://milesmathis.com/g.html> is really a simple unified field equation, and that it has contained the charge field from the beginning. I will now show how this explains various electrical anomalies in the Solar Wind and in the electrical fields of Solar System bodies.

The Sun is neither a classical anode nor a simple thermonuclear machine. Nor is it, at the foundational level, a direct outcome of plasma physics. Plasma physics, like all other physics, is underpinned by the unified field. Instead, the Sun is both a huge fusion reactor and a huge recycler of the charge field. In fact, it requires this recycling of the charge field in order to feed the fusion process.

To begin my explanation, I remind you once again that the charge field in my mechanics is not equivalent to either the electrical field or the magnetic field. The charge field underlies the E/M field, but is not strictly equivalent to it. The E/M field is a field of ions, but the charge field is a field of real charge photons—not virtual or messenger photons, but real particles with mass and radius and spin. These charge photons work strictly mechanically, by bombardment. All material particles (except photons) emit a steady stream of charge photons, to create the charge field. Since the Sun is composed of a stupendous number of material particles, it emits a stupendous charge field. This charge field is emitted spherically or radially and is, in the first instance, always repulsive. The charge field is monopole: its velocity and momentum is always radially out from the center. It varies in only one way: the charge photons may be upside-up or upside-down. In other words, the photons may be spinning either left or right. As a matter of convenience and symmetry, we may call the left spinners anti-photons. But both photons and anti-photons are emitted in the same direction. They are not dipole. They differ only in spin, not in field potential or linear motion.

“Where do these photons come from?” you may ask. “Shouldn't an emission field with mass cause a conservation of energy problem?” It doesn't, because the field is recycled. All the masses that emit the charge field also absorb or capture the charge field. It is the spin of the mass that allows it to do this. As I have shown with the atomic nucleus milesmathis.com/stack.html <http://milesmathis.com/stack.html>, the spin of the particle or collection of particles creates a low pressure at the axis poles. The charge field goes in at the poles and is ejected equatorially. All matter is an engine that exists by recycling this charge field. As with the proton and nucleus, so with all macro-spheres. Spin creates pressure variations in the charge field, which creates the simple engine. The Sun (and Earth) capture the charge field at the poles, and re-emit it everywhere else—but most along the equator.

The electromagnetic field is driven by the charge field, by direct bombardment. At first glance, you would think the electrons and protons would be driven equally, or that the electrons would be driven faster because they are smaller. But on looking closer, you see that the size difference between the electron and proton causes just the opposite effect, in a simple mechanical way. The electrons are driven less by the photon wind, because they can dodge greater parts of it than the proton. The radius of the electron is some 1800 times less than the radius of the proton, so large parts of the photon wind simply miss it. Therefore, the proton is driven more efficiently. This explains in a direct manner the data from the Solar Wind.

It also explains the deflection of the electron by planetary or Solar magnetic fields. Magnetic fields

are caused by the spins on the photons, not by the linear momentum. The proton feels more of the linear field, since it gets hit more often, but it resists the spins of the photons better because it is larger. The protons and electrons are also spinning and are also emitting small charge fields of their own. But, contra the standard model, the proton actually has a greater charge than the electron, simply because it has a greater radius and therefore a greater angular momentum. This greater angular momentum allows it to resist the much smaller angular momentum of the charge field. The electrons, although hit less often, are more likely to be deflected (as a statistical matter on individual ions), because they feel a much greater relative force from the angular momenta of the photons.

In this way, the Sun is both anode and cathode, but only as regards the charge field. Due only to pressure differences, it attracts the charge field at its poles and emits the charge field everywhere else.

On a smaller scale, this also applies to the Earth. The Earth's spin makes it both anode and cathode to the charge field. It recycles the charge field, and the charge field drives the E/M field. This explains the genesis of the Earth's E/M field without postulating dynamos in the Earth. This also explains why the Earth, like all macro-bodies, often seems to be an infinite well of negative charge. Neither the standard model nor the electrical/plasma model can explain why the Earth should act like an infinite well of negative charge. For example, it absorbs a huge amount of mainly positive cosmic rays each year for billions of years with no drain. My unified field theory <http://milesmathis.com/uft.html> explains it by re-defining charge. The Earth recycles both protons and electrons, so both forms of charge are continuously renewed. There is no dipole, so the amount of one charge does not deplete the potential of the other. In fact, there is no potential at all, except the real pressure difference in the charge field, and the apparent electrical difference caused by the size differential between the electron and proton. And the magnetic field is not caused by potential either. It is caused by spin. In the magnetic field, quanta aren't turned by potential differences, they are turned by angular momentum.

This re-definition of the charge field and thereby the electromagnetic field resolves all at once the Velikovsky affair and the role of E/M in celestial mechanics <http://milesmathis.com/cm.html>. In fact, it solves all the problems of celestial mechanics, all the way back to Halley and [Laplace](#).

Astrophysicists in the 50's and 60's could not accept Velikovsky's claims for electrical perturbations between solar system bodies, and physicists of all sorts still cannot accept any evidence of large electrical influences from anyone, and this is because neither the outsiders nor the insiders have been able to say how these influences can fit into equations of celestial mechanics—equations that already work almost perfectly in most situations. Shapley in the 40's and 50's could not countenance any pervading E/M field in the solar system for any reason, because he knew the equations of Kepler and Newton and Laplace already worked. There was no room for an addition. Sagan made the same arguments in the 70's and 80's, and current mainstream physicists are holding firm to that line. This is quite understandable, since the plasma physicists still haven't shown them where to fit the E/M field into the current successful equations. Velikovsky was full of ideas, but he never supplied a single line of convincing math.

But my simple equations do just that. I show where the E/M field fits into Newton's gravitational equation. [The E/M field is already in the equation, hidden by G](#), so no external correction is necessary in most situations. Likewise, I have shown that the E/M field is already inside [Kepler's ellipse equation](#) and inside [Laplace's great inequality equations](#). It has never been a matter of

overthrowing celestial mechanics, or of creating a new unified field equation. I have shown that it was always just a matter of understanding that Newton's equation was already a unified field equation <http://milesmathis.com/uft2.html>> <http://milesmathis.com/uft2.html>. Because Newton's mass field was already a unified field, Einstein's field equations are already unified field equations, too. We did not need to unify, we needed to segregate, so that we could see how both fields create the current equations mechanically.

If you have not yet read my analysis of Newton's gravitational equation, none of this will be plausible, so I encourage you to do so. But those readers who have will understand that this explains the boundary between the Earth and the Sun, the so-called magnetopause. The boundary between the plasmas is caused mechanically by the charge field, since the Earth's charge field is what creates and defines its plasma to begin with. At the foundational level, the boundary is the boundary between the charge field of the Earth and the charge field of the Sun. Both fields are summed radially out, so we simply have a meeting of two spherical fields, one much smaller than the other. Since the charge field is always repulsive, it will exclude all ions, positive and negative, unless the ions are too energetic to be excluded (as with cosmic rays).

This is why Venus can also exclude the Solar Wind, even without a magnetosphere. The ability to exclude has little to do with the magnetic field and more to do with the charge field. Venus has enough mass to create a charge field <http://milesmathis.com/venus.html> strong enough to exclude the charge field of the Sun at that distance. With the Earth, the same is true. It is not the magnetosphere that excludes the Solar Wind, it is the charge field. The charge field creates both the magnetosphere and the boundary, and the boundary is only at the edge of the magnetosphere because both the charge field and the magnetosphere pause at the same place, for the same reasons. The magnetopause is at the charge-pause, because the magnetic field is caused by the charge field. The magnetic field would not be expected to extend beyond the charge field, because the charge field creates the magnetic field. And the magnetic field would not be expected to stop short of the charge-pause, because there is no reason for it to stop short. Ions are driven up by the charge field, and will persist as long as the charge field persists.

By this logic, you can see that it is the difference in the charge field densities that creates the differences in plasma fields, and the boundary. The boundary is that distance where the two charge fields have equal power. They have equal exclusion—defined as linear momentum—but one has more curvature than the other. This means that the magnetic or orthogonal components are not equal, creating a boundary and a “sideways” force. So the Solar Wind doesn't stop or blowback, it goes around. Since the Earth's field has more curvature, the magnetic component at the boundary acts to accelerate the Solar Wind once more. This is why the Wind is going faster as it passes close to the Earth than it was before it got there.

Wiki tells us that the magnetopause is 10-12 earth radii in the direction of the Sun. Using my mechanics, we can calculate that distance directly—something the standard model never does and cannot do. The mass of the Sun is 332,990 Earth's and its density is .255 Earth's. We seek a charge density on the surface of the Sun, and we can get that by just looking at the words. We seek a “charge density”. That could be written “charge x density”, and, as I have shown, charge is just a variant definition of mass. Therefore, we re-write the product as “mass x density.” $M \times D = 84,986$. The Sun's charge density is 84,986 times that of the Earth. So we find by simple math that the charge field density is vastly different than the material density. We are finding the charge field density at the surface of the Sun, so we must sum all the mass “behind” that surface. All that mass

emits charge photons.

Now we seek the point between Earth and Sun where the two charge densities are equal. Since I have proved elsewhere <http://milesmathis.com/moon.html> that the charge field, when emitted by spheres, diminishes as $1/r^4$, we can solve. If the Sun's relative charge density is 84,986 at 1 Sun radius, at 214 Sun radii it will be .00004052. If the Earth's density is 1 at 1 Earth radius, at 12.53 Earth radii it will be .00004057. That is where the charge field strengths match. Since Wiki is measuring from the Earth's surface, we must subtract one Earth radius, giving us 11.53 Earth radii for the charge-pause.

The mainstream cannot supply this simple math because their E/M field has no mechanics underneath it. They are still trying to solve with potentials, which are forces at a distance. The standard model likes to denigrate Newton for having a gravitational field containing force at a distance, but modern E/M theory still is based on force at a distance, even in QED. QED has no foundational mechanics, except a pseudo-mechanics based on the virtual messenger photon. Virtual particles are even more brazen cheats than “physical reasons,” since “physical reasons” is just a dodge. Virtual particles are a non-mechanical lie, told straight to your face.

I encourage you to seek any mainstream math for the distance of the magnetopause. There is none because there can be none. The estimate from Wiki quoted above of 10-12 Earth radii is based on orbiter data, not on math or mechanics. It has to be rough because the orbiter data is rough. But, in fact, there is almost no variance in the magnetopause average. The magnetopause is dependent on the charge-pause, and the charge-pause is determined by the vital statistics of the bodies. Unless the Earth's or Sun's masses or radii change, the charge fields will not change. The magnetic fields can change, due to the ions present, but the charge field cannot change. For this reason, the magnetopause must always return to the average set by the charge-pause, and this average is solid. It is a number that can be found easily, as I just showed.

We can do the same math on Venus, showing that the smaller charge-pause is caused by the nearness of the Sun, not by the lack of a magnetosphere. The mass of the Sun is 408,589 Venus' and its density is .2706 Venus'. If the Sun's relative charge density is 110,548 at 1 Sun radius, at 153.6 Sun radii it will be .0002. If Venus' density is 1 at 1 Venus radius, at 8.4 Venus radii it will be .0002. So the charge-pause of Venus is 7.4 Venus radii from the surface, in the direction of the Sun. That is assuming the low angular momentum of Venus does not further retard its charge field emission. There is some evidence that the speedy and heavy atmosphere of Venus may help in charge field capture at the poles**, but I don't yet have a mathematical expression for the charge field that includes spin. Notice, however, that the standard model has no number, mathematical or from data, for the ionopause distance of Venus. I have just estimated it with simple math. This gives me a chance to make another prediction. I predict that the ionopause of Venus will be found at near 7.4 Venus radii. If it is less than that, I predict it will be found to be because Venus has very little spin.

*Ogilvie, *Journal of Geophysical Research*, vol. 76, no. 34.

**The Venus Express probe, launched by the European Space Agency in late 2005, has discovered a huge double atmospheric vortex at the south pole.
