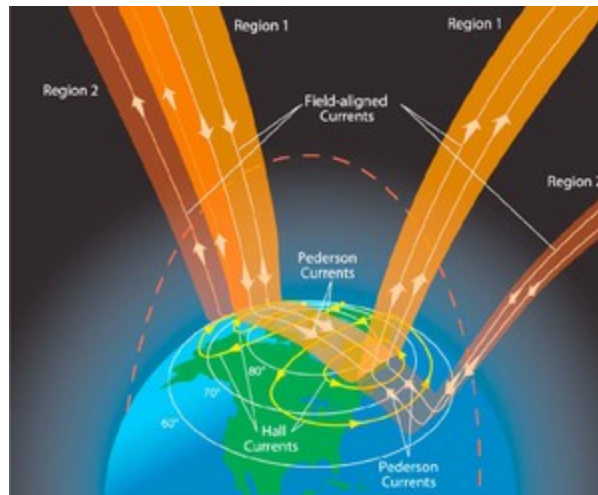


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BIRKELAND CURRENTS



by Miles Mathis

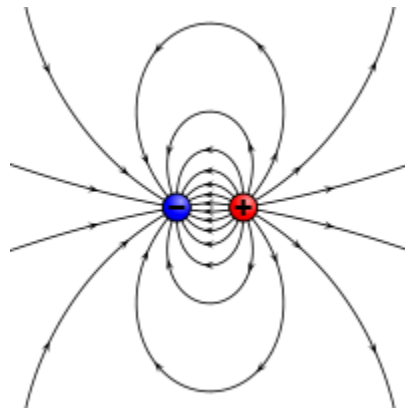
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As I often do, I will analyze current theory as if I am a crash-landed alien, looking for signs of intelligence on Wikipedia and the rest of the internet. Here is the first sentence at Wiki on the page for [Birkeland Current](#):

A Birkeland current is a set of currents which flow along geomagnetic field lines connecting the Earth's magnetosphere to the Earth's high latitude ionosphere.

Huge confusion from the first word, as you see. How can current flow along magnetic field lines? Doesn't that contradict the old definitions of "current" and "magnetic field lines"? Weren't we taught that current flowed along *electrical* field lines? Isn't that what current is? And aren't magnetic field lines supposed to be orthogonal in some way to that current? If so, then how can current follow magnetic field lines?

I will be told I am mixing up the B-field and the H-field, but is the confusion really mine? Doesn't the real confusion exist in the current definitions, which make no sense? To see what I am getting at, we can look at the old magnetic pole model and the H-field, which is commonly diagrammed like this:

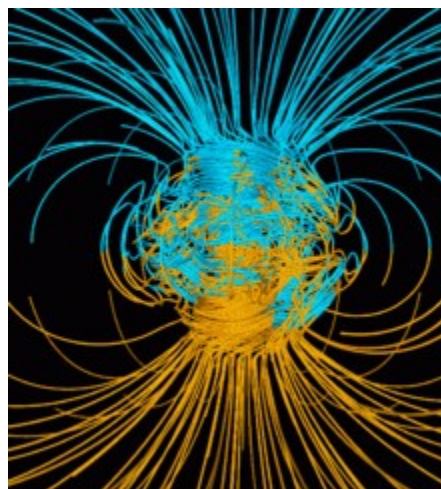


The only way the geomagnetic field and the Birkeland current theory begins to make *any* sense is if we use that H-field diagram, rather than a diagram of the true magnetic or B-field. Wikipedia even admits that, in a way, when we find

The H-field, therefore, is analogous to the electric field E, which starts at a positive electric charge and ends at a negative electric charge.

Analogous? No, not really. More like conflated. The H-field was originally more closely related to B than E, obviously, which is why H and B are both still called the magnetic field. If the H-field were analogous to the E-Field—as we are told here at Wiki—there would have been no reason to come up with three terms, H, E, and B. If H were analogous in any way to E, then H would be called the electric field, like E, instead the magnetic field, like B.

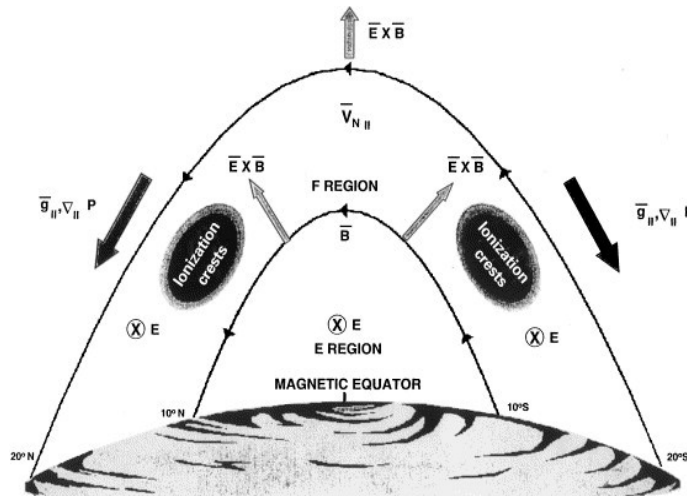
As you see, we can slip the Earth in the center of that last diagram, and we have a basic match to what they now diagram as the Earth's magnetic field. Of course this means all those geomagnetic field diagrams you have seen aren't really magnetic field B diagrams, they are field H diagrams. And once you have current flowing, the magnetic field should not be moving along the same lines as the current (by the old righthand rule).



And that is the first problem. They call it the geomagnetic field, but as diagrammed it makes no sense as a magnetic B-field. It is closer to an H-field, which is not the same thing. When you have moving charges—as we do in the Birkeland current problem and all field of the Earth problems—it doesn't make any sense to diagram the magnetic field as an H-field. You should have a B-field, and anything a

theorist or diagrammer called the magnetic field should be attached to that B-field.

You may understand better what I am getting at if you compare this Birkeland current theory to [Equatorial Anomaly theory](#). There is an Equatorial Anomaly in the Earth's E/M field, creating ionization crests at 17 degrees north and south, as well as a trough at the equator itself. But in this theory, terrestrial current does *not* travel along geomagnetic field lines.

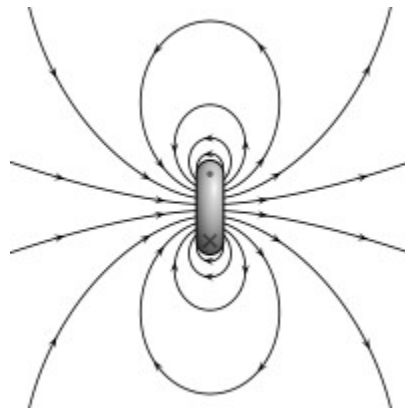


As you see, the current E is said to travel east (into the page) while B is traveling N. $E \times B$ then points up, by the righthand rule. OK, so why does current follow magnetic field lines at the poles, but not the equator? Why do we get cross products at the equator, but not at the poles? Looks to me like they are just pushing the field assignments to get the right vectors at the end, but we have no continuity from one theory to the other.

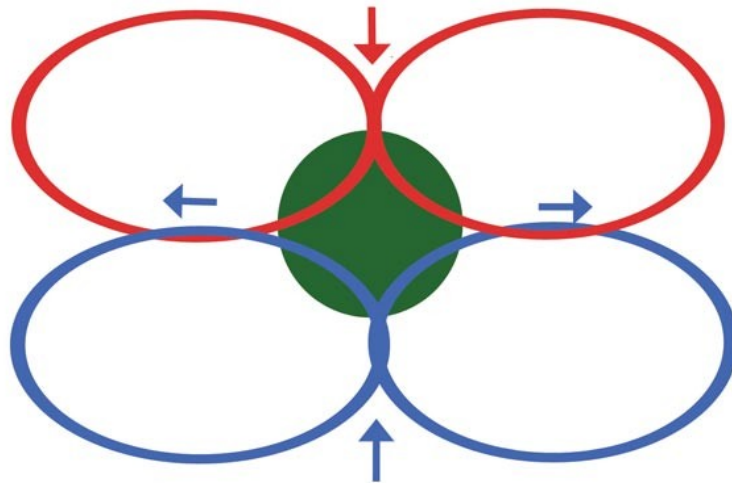
If we look closer, the current “geomagnetic field” isn't really an H-field, either, since the interior lines don't match. Compare the first intext diagram above to the second. We should see interior lines running straight through north to south in the second diagram to match the first, but for some reason they have diagrammed a mess of jumbled lines in the interior, most of them running east/west or in latitudinal circles. We assume that is to act as ballast for their core theories, but none of it makes any sense.

You can see why they didn't copy the interior field lines from the first diagram: that would imply an attraction of the two poles, which would imply a polar flattening far beyond what we see, as well as implying other huge problems the mainstream doesn't wish to address. So they simply go wild in the interior here, hoping you will look away and not ask any mechanical questions.

To see even more clearly the problems here, let us look at what they call the Amperian loop diagram of the B-field.



If we create a current loop and look at it from the side, as here, we get a B-field that follows those lines. That looks somewhat more like my charge field diagram, since we now have lines at the equator. Problem is, we have no lines going in the top or bottom. Like the first diagram, this second one is still basically in two halves (in 2D) instead of four quadrants. It is really the same diagram, just turned on its side.



That is my charge field diagram. Since I have shown that my charge field is basically Maxwell's displacement field D , that is what the *geocharge* field lines of the Earth really look like. That is the correct D -field, in other words.

The mainstream got it wrong because they insisted on diagramming the Earth as some version of what they already knew, and what they already knew was these two B-field and H-field diagrams above. But although the Earth as a whole has some similarity to a bar magnet or classical magnetic field, it isn't equivalent to any of the old fields. Because we have moving charge being recycled through a macro-sphere, we find the field has a bit more complexity than anyone has so far understood.

This is why it has been so important for me to clean up the magnetic field, doing it by starting at Maxwell's equations and working up. For about 150 years, we have actually had three fields assigned to "magnetic." We have had B , H and M , and a mess of equations relating them to one another. But since I have been able to detach D from the E/M field equations, assigning it instead to the charge field (which is a field of real photons), I have been able to clarify many problems, including now this one. The D field is both submagnetic and subelectrical, since it supports and defines them both, but it is

strictly equivalent to neither. It is determined by moving photons, not moving electrons, moving ions, or moving charge. In the presence of moving photons, you will usually have moving ions, but by separating the fields, we can better understand the underlying mechanics.

Once we understand that the real field of the Earth matches neither the mainstream H-field or B-field diagrams, we can re-interpret Birkeland currents. [As I said in a recent paper](#) on Venus and Electrical Universe models, I don't really question Birkeland currents, I only question the given circuits. As I said there, we would be better letting the Birkeland current be and concentrating on the *cause* of them. It isn't the Birkeland currents that cause the effects, it is the charge field that causes *both* the Birkeland currents and the other effects. Therefore, what we most need is diagrams of charge. We don't need magnetic field lines (either B or H or M), electrical field lines, Birkeland current lines, or anything else. We need charge field lines, because these determine all the motions and all the mechanics.

As you see from my diagram, the charge field creates circuits (of a sort), but not the circuits we are used to or the circuits that are commonly diagrammed. In a similar way to [how I expanded the wavefunction](#)—explaining away nonlocality—I have expanded the geocharge field diagram. Basically, in correcting the wavefunction, I doubled the degrees of freedom in it, giving us a sort of doubled wavefunction. This doubled wavefunction allowed the quanta to move through the devices in sequence in an easily trackable way, doing away immediately with all the old paradoxes. In this paper, I am achieving the same thing, doubling the degrees of freedom in the geo-field and in the math. Notice that my diagram has four quadrants in a 2D diagram where the current one has two halves. If we drew the diagram in 3D, my diagram would again double the current one, having two tori instead of one.

This doubling in both cases is no accident, since the same basic mistake kept the mainstream from seeing the true complexity of both fields, quantum and celestial. The same basic mistake that kept them with half a wavefunction for a century also kept them with half a geo-charge field. The mainstream has long defined the E/M field as polar, but it is really bi-polar. You can see that very clearly in this problem, where the polar field is split down the middle, giving us not two directions, but *four*. In a polar field, you would have only north/south. But in the real world, you have north/south and east/west. Bi-polar or quadrilateral. We saw that in the wavefunction, where we had to specify not only N/S but E/W; and we see it again here, where we have charge moving in all four directions.

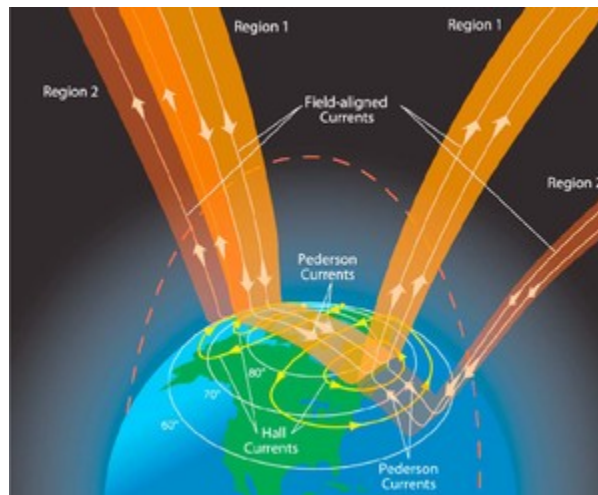
In hindsight, we must be surprised that quantum physicists missed this simple fact, since it is a fact we know from everyday experience. Space is not polar, it is quadrilateral, and no one has ever been able to specify all the degrees of freedom in any physical problem with only two poles. How then could the E/M or charge field be polar? We should have expected it to be bi-polar. All our 2D maps have been quadrilateral from the beginning, with N,S,E,W. How could the geomagnetic field of the Earth only run N/S? Applying the magnetic pole model (first diagram) to the Earth never made any sense, since it implied an H-field at the surface of the Earth moving sideways.

That's right, according to that diagram, the geomagnetic field at the surface of the Earth should be along the surface. That is easiest to see at the equator, where the field lines are moving south to north. Do we find either current or magnetism moving south to north at the equator? No. We see a strong equatorial anomaly, but not one of that sort. We certainly don't see field lines simply bypassing the equator at all altitudes as if it weren't even there. But that is what the current geomagnetic field diagram does.

You will say, “Wait, according the diagram above, B *does* move north at the equator!” Problem is, they are drawing B that way only to get $E \times B$ to point up. They know how the righthand rule works, so they

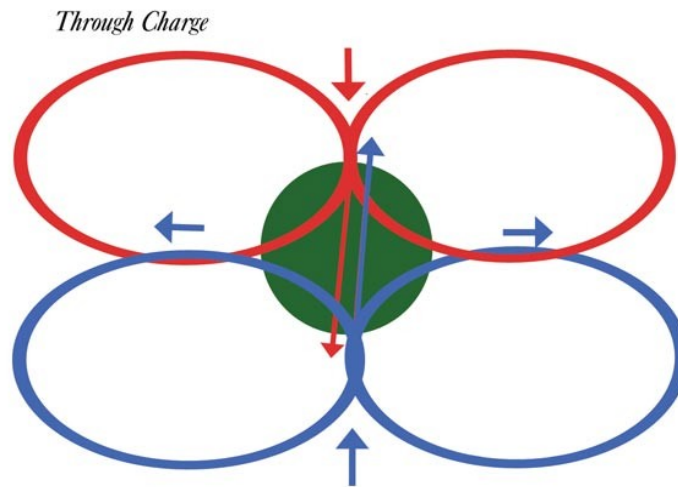
are just drawing it to fit the necessary cross-product. But they have no data that shows B actually moving that way. Their raw data is the motion of ions, and the ions are moving up. They don't have any real particles moving north, so B is just an inference. In [my paper on the Equatorial Anomaly](#), I show it is a false inference. The ions are moving up at the equator because charge is pushing them. Given charge rising, you don't need a cross product to explain the motion of ions up. Whatever the direction of the actual B-field is—and it will vary with latitude—will depend on the summed spin of the charge coming up, not on the direction of current. In short, we have a crossing of charge from both poles at the equator, and about 1/3rd of that charge is antiphotons. So to draw the fields, we sum the spins at that latitude and altitude; we don't back-engineer the B-field from E or F.

OK, so what does this mean for Birkeland currents? It means the field lines are wrong there, too. Let's return to the diagram under title, to see this more clearly.



Notice how they combine the incoming lines and outgoing lines, implying that they are connected. See how the Pederson currents are drawn as a connection between the currents going in and the current going out? The reason they do that is to protect their core theory models. If you let the orange lines penetrate the Earth and continue on down, they would interfere with current core heating models, so these modellers prefer to treat the surface of the Earth as impenetrable. The Birkeland currents are drawn as coming down, being diverted sort of southeast at some altitude in the atmosphere, and then going back up. Others in region 2 move a shorter distance sort of due south and then move back up.

But this diagram is complete garbage. Yes, it is roughly correct in that the currents drawn do exist. We know that directly from data. But they don't stop at the surface of the Earth, and they aren't diverted sideways at the surface of the Earth or atmosphere for no reason, as is implied here. What is really happening is that the orange lines coming *down* continue on down and are either diverted in my charge channels to emerge most heavily near the equator; or they pass along the pole to the south, emerging from near the south pole as through charge or through current. By the same token, the orange lines coming *up* are coming out of the Earth. They are not created by the Pederson currents. They are the results of through charge originating at the south pole region and going through the Earth.



To read more about through charge, you may see [my paper on Period Four](#), where I diagram the through charge channel of Iron, and my [most recent paper on Venus and Saturn](#), where I show how through charge works there.

So although the down current, the Pederson current, and the up current exist, they aren't connected as diagrammed by the mainstream. The down current is NOT diverted directly into the Pederson current, and the Pederson current is not diverted directly into the up current. They all exist independently. The Pederson current is secondary, and is created after the fact by the other two primary currents. Yes, it draws its own current from the other two, and the modellers could claim this is what they are modeling. But by drawing the currents as they do, they fail to model the fact that the up current is much stronger than the Pederson current, and therefore cannot be caused by it. Nor can the up current be explained as the sum of the Pederson current plus the region two currents. It isn't the Pederson and region two currents that cause the up current, it is the up current that causes the Pederson and region two currents. *First* you have the up and down currents, caused by the vectors in my through charge diagram. *Then* you have the Pederson and region two currents as a response to those.

That brings us to our next question: are these currents really Birkeland currents? That question might seem academic, since I might answered, "Of course they are. That is what we define Birkeland currents as being, so they are Birkeland currents." But what I mean is, are these currents the same as the currents we see in plasma experiments? Just because they have similarities doesn't mean they are caused by the same field mechanics. We have seen above how mainstream physicists rushed to apply magnetic pole models to the Earth's field, and we see the same thing with plasma physicists rushing to apply their diagrams to the Earth. Are we sure the currents are analogous?

Again, no. We can see this most clearly by asking if there is any Z-pinch going on here in the diagram of the Earth's Birkeland currents. A Z-pinch is a plasma confinement in which the magnetic field is used to pinch the electrical field. That isn't happening here. Although they draw yellow Hall Current lines around the magnetic field lines—implying a possible pinch—nothing like plasma confinement is going on. We can see this just from studying the line definitions again. Remember, the current is following magnetic field lines, so the orange lines are *both* current and geomagnetic field lines. The only way this could be due to some sort of Z-pinch is if the Hall Current lines were also magnetic field lines. But in that case, we would have magnetic field lines going around magnetic field lines. They are pushing these diagrams and explanations to match plasma physics, but they simply don't. They are a

mess.

At best, these currents at the poles of the Earth are *pseudo*-Birkeland currents or Birkeland-*like* currents. They share some characteristics with currents produced in plasma experiments, but the currents aren't the *result* of any plasma. Yes, the recycled charge field may create some atmospheric plasmas, but it isn't the plasmas that explain or create the Birkeland currents. It is the charge field that creates the pseudo-Birkeland currents, the plasmas, and everything else. We know this just from the fact that the fields and currents must pass through the entire Earth, and most of the Earth is not a plasma. Charge recycling doesn't require plasmas or even ionization, since charge recycling is what *creates* ionization and plasmas.

We can also tell this from [charge channeling through the nucleus](#). Charge moves through the nucleus in much the same way it moves through the Earth, in similar charge channels. Well, the nucleus is not a plasma. A plasma is an ionized gas, and the nucleus is not an ionized gas. As I have shown in my nuclear papers, the nucleus may or may not be ionized: it will channel charge either way. If ionized, it channels charge more efficiently, but even a non-ionized nucleus (with its full array of electrons) will channel at near full-strength.

What this means is that plasma physicists—like mainstream physicists—have their fields and explanations upside-down. They are trying to explain charge channeling using plasmas, but it is plasmas that are explained by charge channeling. Plasmas require strong charge channels, but charge does not require plasmas. Therefore, if you wish to explain the fields around celestial bodies like the Earth, you have to start with charge, not with plasmas. Charge is the fundamental field, and the plasma is just one incorporation of that field.

This is important, because using plasmas has never helped the Electrical Universe people discover the things I have discovered. Calling the Earth's polar currents Birkeland currents never helped them discover the bi-polar field, the antiphoton, the doubled wavefunction, the nuclear diagram, or the planetary charge recycling model. In fact, some plasma theory has acted as a further cloak to mainstream problems. It has done this by burying old E/M problems under sexy new plasma terminology. For instance, we would have expected plasma physicists—being primarily electrical physicists or engineers—to have uncovered the problems I have found in Maxwell's equations. We would have expected them to have closely analyzed the D-field, as I have. We would have expected them to discover [that Maxwell's](#) and [Gauss' equations](#) were unified field equations, as I have. But they didn't. Like the others, they left those questions in the dark, unanswered, while building further castles in the air.

The plasma physicists have done a lot of good work, and I don't wish to imply they haven't, but the solution to the biggest problems was never going to come from plasma research alone. As I have shown over the past decade, the only way to solve the biggest problems was to go back to the source of them, one by one, unwinding the math and theory line by line. This usually took going back at least a century, and often a lot longer. It took putting a question mark by absolutely everything and giving no one a pass—not even Newton or Einstein or Maxwell. And most of all, it took requiring real mechanics at every step.

It was only by proceeding in this way that I have been able to pull the charge field out of the dark, solving this current problem and many others. Charge went underground with Ben Franklin, was buried deeper by Faraday, still deeper by Maxwell, and still deeper by Bohr. I have worn out a warehouse of shovels digging it out, but the work was worth the effort. Once we have the charge field

to work with, we can sort through all these old diagrams in almost no time, putting each house in order.