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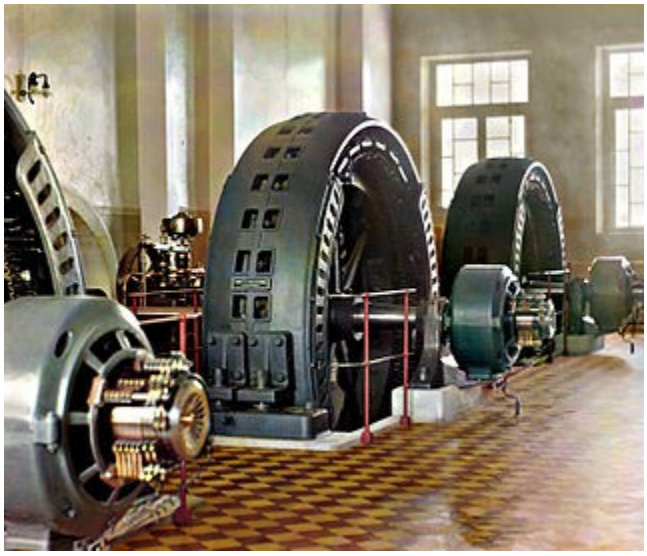
Alternating Current and Inductance



by Miles Mathis

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In previous papers on electric charge and the battery circuit and other problems, we have seen that mainstream electrical theory is damnably deficient and criminally confusing at the fundamental and theoretical level. I solved all these previous problems with my charge field and I will do the same here. By making the charge field a real field of real photons, we will be able to better understand the underlying mechanics of all these free-floating and undefined fields of textbook electrical theory.

According to the textbook definition, in alternating current "the electric charge periodically reverses direction." Why is that a problem, you may ask. I will be told it is obviously true in one sense, since we know the field is reversing *in the generator*, whether it is a spinning magnet or some other type of dynamo. And I agree with that. I am not questioning the "alternating" part of alternating current here, I am questioning the "current" part. The problem is that the alternating charge in the generator can't cause an alternating current in the wire, because if the electric charge in the wire periodically reversed no current could be created. Since the periods are all the same, the current would come back as much as it went forward, which would give us no net movement of either charge or current down the wire.

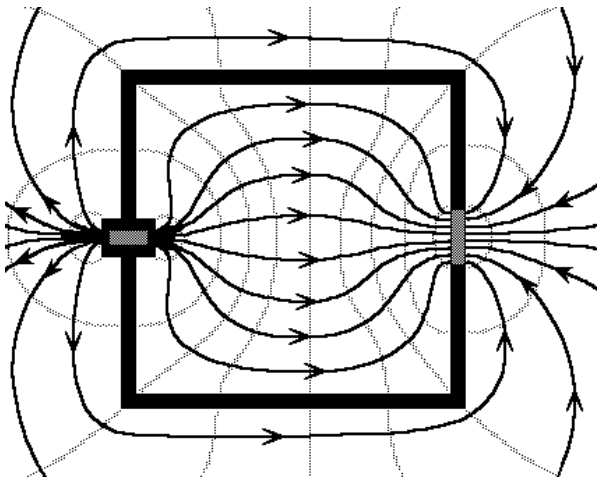
To see what I mean, we have to go back to the textbook definition of current. Current is defined as the "flow of electric charge." Note, *not* the flow of electrons or other ions, but *the flow of charge*. So the current in the wire is supposed to be caused by a flow of charge, which has to be caused by electric potential difference between one end of the wire and the other. That is what voltage is, remember?—A potential difference from one end of the wire to the other, not a potential difference from one end of the magnet in the generator to the other. Of course the generator will have its own voltage (or magnetic equivalent), but that is not what they normally mean by voltage. The voltage in this problem is the

voltage down the wire, not the voltage between the north and south poles of the spinning magnet.

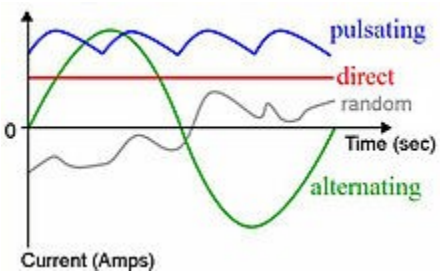
If charge potentials, charge flow, or current alternated in the wire, then the electrons would have to go back and forth as well, sort of wobbling in place. How is energy transferred down a line that way? They will tell you there is some sort of domino effect, but if the charge reverses, the direction of the domino effect would also reverse, sending as much energy back as forward. In that case, the same amount of energy would come into the generator as is going out. That isn't what we see. Clearly, alternating current isn't working like that.

If we want to be rigorous, we must say that we have power created by an alternating field, but we do not have alternating current. Or, the current may be alternating in some sense, but it isn't alternating down the line of the wire. The *current* itself is not alternating. The charge in the generator is alternating, but the electric potential down the length of wire is not.

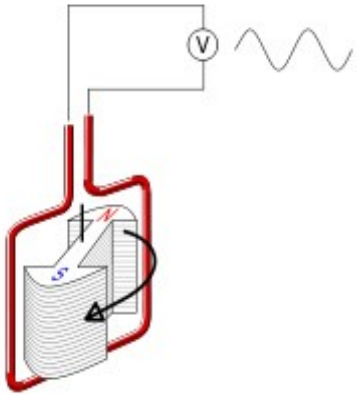
So what is alternating in the wire? What is alternating is the transverse motion of charge, not the longitudinal motion of charge. To understand this, we have to go back to my paper on the battery circuit, borrowing a diagram from there;



The heavy black lines are the circuit, the gray lines are the E field, and the arrowed black lines are the Poynting field S. You can ignore the S field for now. What you want to study is the gray E field lines. Since we have a battery here instead of a generator, the lines won't be exactly the same, but in general the gray lines are orthogonal to the circuit. To say it another way, they are *transverse*. The motion of energy is west to east here, but the gray lines run north/south. Well, when we are reversing an alternating current, we are reversing the gray lines, not the current itself. Therefore, this diagram from Wikipedia is flat wrong:



Negative current implies the current is flowing backward into the generator, which is not what happens. If that happened, the net power delivered would always remain zero. The vertical axis here should be labeled as the generator field or something, not the current. This diagram from the "alternator" page is a bit better:



But the sine wave should be superimposed right on the wire, instead of out to the side of the receiver. It is almost like they try to confuse you on purpose with these diagrams.

This immediately explains why the charge is forced out to the skin of the wire in AC but not DC, without all the flapdoodle you hear from the mainstream. The textbook explanation of the skin effect is eddy currents caused by a changing magnetic field, but you don't need eddy currents if you already have charge moving transverse to the wire in this wave pattern. Just think of that sine wave as a corkscrew running down the length of the wire. It is telling us the real photons in the charge field are moving west to east here, but that they are also moving up then down then up. The west-east motion is caused by simple charge emission from the generator; and the alternating north/south wave is created by the spinning magnet, which reverses the charge field potentials at the source and everywhere in the vicinity. If the photons are alternating like that, of course they will push ions in the wire to the skin, by simple bombardment and poolball mechanics. The photon field works like a real wind or stream, carrying free particles with it.

You will say, "That doesn't help us, because the photons would push x particle in the wire up then down, giving us no net movement." No, the sine wave *travels*, which is telling us the photons are pushing particles up at point x and particles down at point y somewhat further on. The sine wave isn't moving both up and down at the same place in space, is it? Well, that means that neither are the photons. So a given free ion in the wire will be pushed either up or down, but not both. So these ions are pushed to the skin. Once there, they facilitate the path of the charge, not by moving longitudinally

themselves, but by recycling the charge along the straightest path to the receiver.

This also explains inductance. The whole idea of inductance is something they invented because they don't have a real charge field. Without inductance, they can't explain why current moves in AC, as above, so they come up with inductance as the explanation. The textbook definition of inductance is a voltage produced by a changing current. That is odd beyond odd, since they previously defined current as produced by voltage. So they are telling you that voltage causes current, and changing current causes voltage. I think you can see they have gone circular. The effect cannot cause the cause.

Once you have a real charge field creating your field of initial potentials—both electric and magnetic—you don't need inductance. Mutual inductance is easily explained because the ambient charge field links all local charge fields. And self-inductance is just a ghost. Once you understand how the field really works, you don't need it. It isn't inductance that is the cause of energy transfers, it is the charge field.

All this goes back to initial confusion by Faraday, which has persisted to this day. Faraday didn't recognize the existence of a real charge field, composed of real particles like photons. Nobody at the time did. Therefore, when he saw these effects being produced, he couldn't show a direct cause. Instead of being *created* or *produced*, they had to be *induced*. Something that is induced is produced indirectly, by unknown means. Think of the difference between deduction and induction in philosophy. Deduction is supposed to be a straight line of logical cause and effect, while induction can be much less rigorous. It is much the same here. The word *induction* was not chosen by accident. It was a sort of admission that no mechanics could be pointed to. Faraday then created some lines of potential or force, but they were back-engineered from the motions. No kinematics was involved, and Faraday admitted it. How could he not? While it is not surprising that Faraday did what he did at the time, it is quite surprising we have improved on it so little in almost two centuries. We now have mountains of data pointing directly at a real charge field composed of real particles, but we still teach electrical engineering based on these old outdated ideas. It would be like medical schools still teaching leechcraft.

To see what I mean, we can look at the wording of Lenz's law:

An induced electromotive force (emf) always gives rise to a current whose magnetic field opposes the original change in magnetic flux.

That law is missing the main player. It starts from an effect and has no hint of a cause. We start with an induced emf, which then causes a current which causes a magnetic field that opposes the original flux. So we can see Lenz means for the magnetic flux to be the first cause, beneath the emf. But what causes the magnetic flux? A spinning magnetic field, say. We know what causes the spin, since we spin the magnet, but what causes the magnetic field? To get that, we have to have potential differences in the field. And what causes those? Some sort of charge differentials, but not simply density differentials, since those density differentials would be electric, not magnetic. To explain the magnetic part of charge field potentials, I have shown you have to have spin differentials on the photons (as well as density differentials), and I didn't make that up from whole cloth. Maxwell also believed it, although he wasn't able to sell the idea. Schrodinger also believed it, since he assigned the wave function to charge density, not the probability amplitude. All these initial field potentials have to be caused by real particles, since only real particles can have field densities. An empty field cannot have any density. An undefined field cannot have any density. Only a field with something in it can be assigned a density. We know it isn't an electron density, so it must be a photon density.

But we won't get into all that here. The only thing I want you to notice is that if we have charge field potentials pre-existing and causing the initial magnetic field here, those potentials remain with us as we look at the emf and the current and the opposing magnetic field created. And if we follow the underlying charge field, we will see we can explain all of them without inductance. Which is good because inductance is a name given to nothing.

I have already explained current—both AC and DC—as the motion of photons. It is photons moving from generator to receiver that explains the transfer of energy. So all that remains is to explain that creation of the opposing magnetic field. Why would AC automatically create it but not DC? To see it, we only have to return to our corkscrew again. Since any spinning magnet will have width, any real experiment will be 3D, not 2D. Which means our sine wave is 3D, making it a corkscrew. To get that corkscrew in the generator to push charge into the wire—instead of the reverse—we have to turn the screw in the right direction. If we spin the magnet one direction, it will create current in one direction, but will not also create current in the opposite direction. All these magnetic generators have a chirality, although you aren't often told that. Well, as it turns out, you have to turn your corkscrew counter-clockwise to push the charge through the wire. Problem is, once you have your current running, the righthand rule turns on, and a new magnetic field is created that has to obey that rule. And from the point of view of the generator, that righthand rule creates a clockwise motion. It looks counterclockwise if you look back from the receiver, but from the generator it looks clockwise. So your induced field counters your original field.

But the opposing field isn't some analog of Newton's third law, as you are taught. It is a natural outcome of spin mechanics. It can't be an analog of Newton's third, since there is no equal and opposite reaction. The opposing field created isn't equal to the original field, for if it were, the current would be stopped. If the opposing corkscrew were just as big as the original, the emf would sum to zero. Yes, we still have conservation of energy laws, but we have to be rigorous in applying those as well.

The final question for me to answer is why the alternator would be sending in charge in a counter-clockwise screw. Shouldn't the alternator also obey the righthand rule? Yes, it does, but we have to look more closely at the mechanics. What is the alternator? It is a magnetic field that we make spin. So what is the magnetic field? We have seen that it is spinning photons. As it turns out, every single photon obeys the righthand rule. Except for the antiphotons. But since the anti-photons are outnumbered on the Earth, if we sum the field we find a total field that always obeys the righthand rule. That total field is the magnetic field.

However, that is just the stationary magnetic field. We have a spinning magnetic field here. We are applying a macro-spin to a field of spinning particles, and then feeding that field into a wire. So we basically have two separate spins to look at, and each one will obey a righthand rule. Well, if you spin a magnet, you can't spin it on the N-S axis. You can see that from the mainstream diagram of the alternator above, which is correct. You can also see it from your refrigerator magnet, which you can spin on the plane of the refrigerator door with no resistance, but which you cannot flip over. You can flip magnets one way and not another. This means we have to obey the same spin stacking rules that we found in my quantum spin theory. You have to stack spins like gyroscopes, with larger spins orthogonal to inner spins. In short, if you stack two spinning fields, as here, you are stacking the two righthand rules. The two righthand rules become a lefthand rule, of a sort. What was clockwise in the single spin field becomes counterclockwise in the double spin field. So if you feed a double-spin field into a wire which induces a current, that current will then induce a magnetic field that is opposite your

original spinning field. In short, a non-spinning field will resist a spinning field, in this case (and others). And the reason is once again those spin levels. Everything here is spin mechanics at the quantum or charge level.