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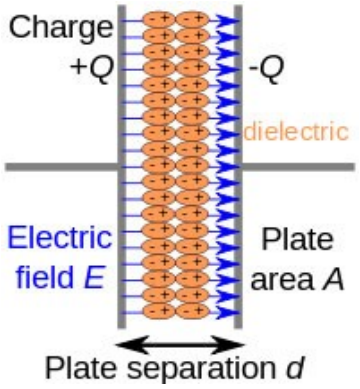
Dielectric Polarization



by Miles Mathis

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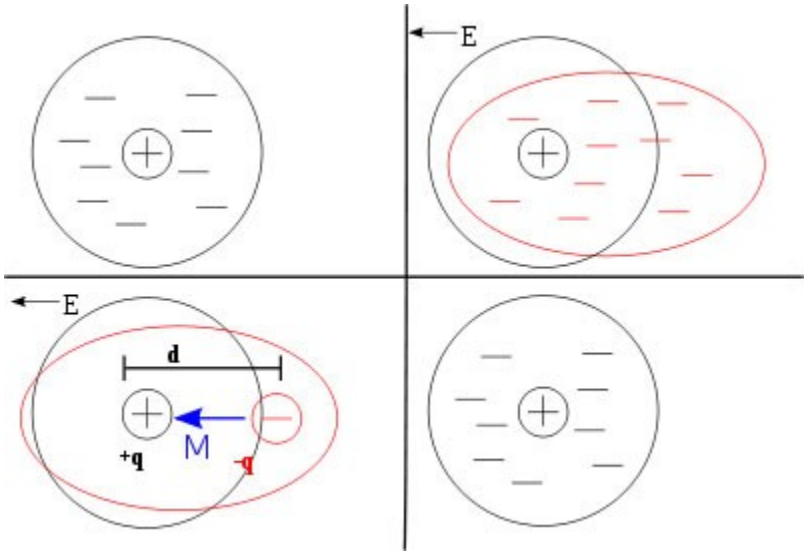
I will extend my recent analysis of Period 4 of the Periodic Table by looking closely at the current definition of a dielectric. Here I will show how my diagramming and explanation of through charge in Iron helps us to understand the dielectric better.

A dielectric is currently defined as an insulator that has been polarized by an electrical field. Although a dielectric is a poor conductor, it is said to have high polarizability. Just by this, we can already see that the dielectric has been misnamed and misdefined. Since dielectric is short for dia-electric, and since *dia* means "through" in Greek, the term is a misnomer. A "through-electric" would imply conductivity. Since I will show you we have the opposite effect here, the name must be changed. I will offer you a name change after I correct the theory and diagrams.

The first problem we encounter here is that the classical E/M field was taken over by quantum mechanics about a century ago, and all real spins were jettisoned. Without real spin, none of these problems could be solved mechanically, so mechanics was also jettisoned. Dielectric polarization is now explained with pushed diagrams and fudged math, like everything else. As an example, we can look at this from Wikipedia:



Each atom consists of a cloud of negative charge (Electrons) bound to and surrounding a positive point charge at its center. In the presence of an electric field the charge cloud is distorted, as shown in the top right of the figure. This can be reduced to a simple dipole using the superposition principle. A dipole is characterized by its dipole moment, a vector quantity shown in the figure as the blue arrow labeled M. It is the relationship between the electric field and the dipole moment that gives rise to the behavior of the dielectric. (Note that the dipole moment is shown to be pointing in the same direction as the electric field. This isn't always correct, and it is a major simplification, but it is suitable for many materials.)

That is naïve in the extreme, as I hope you can see, both in diagram and theory. My readers—who have gotten used to my nuclear diagrams—will find that diagram to be a sad piece of art indeed. It is also wildly dishonest. There is no mechanical reason these bound or orbiting electrons would be displaced to the right, since E is said to apply to free electrons, and these electrons are not free. They would have to be very lightly bound to be displaced that much, and according to current theory, they aren't. Furthermore, there is no evidence that electrons ARE displaced backward to the field. It is simply an assumption. Even worse, perhaps, is the third diagram, which implies that the electrons want to return to their original positions, creating a vector which they assign to the dipole moment. But even given current theory, they *won't* want to return to their original cloud positions until E is turned off. In that case, the vector would indicate their return. But E *hasn't* been turned off, so there is no vector. You can't have electrons moving right but wanting to move left, since that indicates some sort of mishmash of kinetic and potential vectors, or a mishmash of present and future vectors. It is just a pseudo-physics of wish fulfillment. This is the current state of the art regarding all the various dipole moments, but they are all just transparent fudges like this.

The reason they have to publish this embarrassing push is that they are trying desperately to solve without any real spins, without any knowledge of nuclear structure, and without any mention of a real charge field. The only thing they have is the sad old electron orbitals, so they try to solve everything with those.

They tell you they have polarization but then try to explain polarization without real spin. See how their diagram has no spin in it? Everything is explained with some linear vector. In current theory, they try to teach polarization as some sort of egg-shape caused by cloud deformation. They create the egg as above, by just a linear offset of the electron cloud, then draw plus and minus charges on the ends of the egg and call that polarization. But that wouldn't work even according to current theory, because

even if we allow the separation of charges by that hamhanded cheat, the fake polarization produced doesn't have enough degrees of freedom to solve any real problem. For instance, that doesn't explain why real atoms act like multipoles. To create multipoles by this pseudo-mechanism, you would have to apply multiple E's simultaneously, and we know multipoles are created without that. We know that nuclei have multipoles even without *applying* any E-field at all. So it can't be the applied E-field that is creating the polarization. As usual, the mainstream has its cause and effect mixed up. We know that atoms have polarization before the E-field is applied, and so the E-field can only be augmenting a pre-existing configuration. But since the mainstream hasn't diagrammed the atom, it is ignorant of that configuration. Being ignorant of any configuration that could explain polarization rationally, it has to come up with this push, telling you that the applied E-field creates it from nothing. Although the mainstream *knows* that is wrong, they teach it anyway.

Another problem is encountered in that cloud, and the way the applied E-field is said to react with it in this problem. Remember, in quantum mechanics that cloud is nothing like a real particulate cloud. It is a *probability* cloud, and if you try to treat an electron as a discrete object like a marble or a waterdrop in a cloud, mainstream "particle" physicists shout you down as a caveman. And yet here, they allow themselves to treat this cloud like a particulate cloud, one that can be moved over by a passing field. But if it has been moved over, the probabilities have been moved over, which means the electron in that cloud is now more likely to be over there than in the middle, where it was initially. The problem there is that the movement destroys the stability of the "orbital." If you change the shape of the orbital, even as a matter of probabilities, it is no longer the same orbital with the same wavefunction or the same numbers. Nothing in the current rules of orbitals allows you to just shift the orbital over into a egg, while claiming it is still the same orbital. In fact, everything in the rules *prevents* you from doing that, so I don't know why they are doing it.**

Just imagine if you did the same thing with a planetary orbit. Say you were initially given a circular orbit, and you passed a heavy field of dust or gas by this planet left to right. Afterwards, you claimed that this field of dust pushed the planet over to the *left*, into a stable ellipse. Well, wouldn't you also have to show that was physically possible? Even if we ignore the reverse motion, wouldn't you be required to prove or at least indicate that this caused the same stability and energies as before, and not instability, using your given fields and your given math? Have they even begun to do this with the shifted electron orbital? No. They just propose it, draw you a rough picture, and move on.

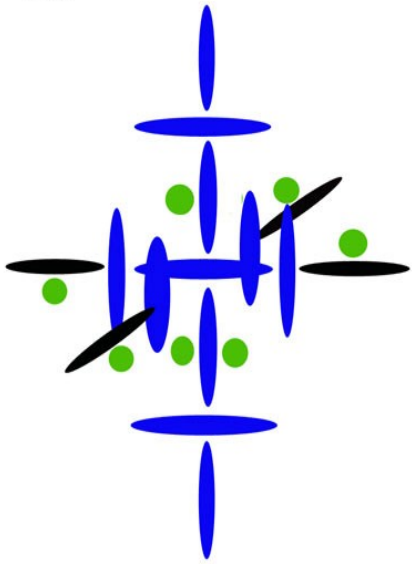
Just as this would be impossible to prove with a planetary orbit and gravity only, it is impossible to prove with any electron orbital and the E/M field. Such a shifted orbital would have to bring the electron closer and then further away from the nucleus than it was before. Otherwise the diagram has no physical reality, and it is just a floater. Well, when the electron is closer, it has lost the balance it previously had (whatever that was). And the nucleus has no mechanism for moving it back out to its original balance. If the nucleus is attracting the electron, it cannot reverse that attraction over some dt's to suit these theorists. A closer electron would need less attraction to move back out, but the E/M field doesn't work that way. The closer electron should feel *more* attraction. Coulomb's law, like Newton's, is an inverse square equation, remember? So you see, as usual the theorists are just proposing whatever they need as they need it, and ignoring any and all conflicts with their own field definitions and equations. And if you really push them on a question like this, they hide completely in their "quantum mechanics," where they can ditch real mechanics altogether and propose virtual particles, borrowing from the vacuum, symmetry breaking, asymptotic freedom, and so on—in other words, even worse fudges than the ones we are seeing here.

Also remember that, *according to their own rules*, shifting an orbital over into another shape should

change all the orbital numbers, making it a different orbital. In other words, the electron should have a different energy in a shifted orbital than in a non-shifted orbital. To shift it, the applied E-field should have transferred energy to it. Otherwise, how did it shift it? And why would it wish to go back later, creating the vector they assign to the dipole, unless it lost the energy given it by the E-field? If cannot shift and shift back unless it has gained and then lost energy, as a whole. Well, if it has changed energy in this interaction with the E-field, it is not the same orbital it was before. In which case, the entire charge balance of the atom should be thrown off. If the orbital or orbitals have increased in energy, then they can no longer be said to match the element they are attached to. In which case they should immediately sluff off, creating ionization. Since we don't see that, we know nothing is happening here as in that diagram. As you will see below, current theory gives that egg-shaped orbital less potential for ionization, not more, which means the entire theory is upside down to any sense.

I could just send you to my previous papers to solve this, but I will import the most important diagrams and information into this paper, to make it as easy as possible to compare my diagrams to theirs. I will start with my diagram of the Iron nucleus:

Iron



Blue disks are alphas (Helium nuclei) and black disks are protons. Green circles are neutrons. Each alpha also contains two neutrons, but since they are completely bound they aren't as important to my diagrams. My diagrams were created mainly to show the charge channels through the nucleus, which is why I have diagrammed the important bodies as disks. Charge emission is at the equator or edge of each disk, so you can follow the channels very easily. The main charge channels of the nucleus come in at the poles and out at the nuclear equator. So in this case the charge is understood to be coming in from the north and south and exiting through the four black disks (which I call the carousel level—it spins like a carousel).

Already you can see that this creates a field complexity far beyond anything the mainstream has been able to diagram. But there is more. I have shown that the charge field itself is also “polar.” Charge is composed of photons, and these photons can be separated into left spinners and right spinners (which I also call antiphotons). Due to field potentials, the photons come in the south pole of the nucleus and

the antiphotons come in the north pole. Most of both then exit through the carousel level. This gives us another degree of freedom, explaining things like beta decay with straight mechanics.

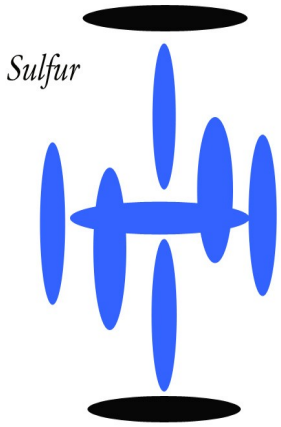
So while the mainstream diagram only gives you one "polarity" (and has to manufacture vectors to do it), I have given you three. The nucleus is polar, in that it has a spin axis from north to south. It has that polarity before any E-field is applied, and in fact it can create its own E-field from any charge field whatsoever. But the nucleus is also quadrilateral, in that another polarity is created by the charge channels. Since charge normally comes in N or S, but exits E/W in a circle, we have a second orthogonal "polarity." We then have a third polarity caused by the charge field. Since charge is already polar before it hits the nucleus, the field created by charge channeling is what I call bi-polar. It is a polar field being recycled by a polar body, so it is twice polar. And once we include the E/W circular emission, we have a sort of tri-polar field, or a field with three polar degrees of freedom. All that is mechanical, and I can and have drawn you a picture to explain it.

You will ask why the nucleus emits at the equator. Why not channel from pole to pole? Angular momentum. As I said, the nucleus is spinning. Not all photons will channel through: some will hit the outside of the nucleus and cause it to spin. All that is necessary for that is an ambient charge field that is not completely balanced in the four directions (or completely symmetrical concerning spin). Once the nucleus is spinning as a whole, it will have more angular momentum at the equator. This is also what explains charge channeling by the Earth and all celestial bodies. The sphere will naturally create greater angular momentum at its equator, and this drives the field potentials in and around the sphere. Well, the nucleus is not a sphere, but it is an octahedron, which works the same way regarding angular momentum at the equator.

In my paper on Period 4, I showed how this field naturally explains through charge in Iron, which explains how photons are spun up as they pass through the pole, creating magnetism. It also explains why we have two fields, electrical and magnetic, and why they are orthogonal. Well, it obviously explains the dielectric in the same way. Specifically, the applied E-field does *not* make the insulator into a conductor, and that is because the E-field is applied in such a way that the extra charge introduced is stored in the material rather than transmitted through it in a line. We are told this is because the substance becomes polarized, but although that is true in a way, it is vague. We are told that "If a dielectric is composed of weakly bonded molecules, those molecules not only become polarized, but also re-orient so that their symmetry axis aligns to the field." Again, true, but criminally vague. For the question remains, "Why and how?" And once we have the alignment, how does alignment *prevent* conduction?

Normally, that sort of alignment should help conductivity, not harm it, but we know that isn't what is happening. Why? Well, I will show that we do indeed have both a sort of polarization and a sort of alignment, but since neither is able to augment the through E-field, we have no boost in conduction. For this reason, they aren't really either alignment or polarization. We should call the phenomenon a field *coherence*, since we do have atoms matching themselves to their neighbors. But this coherence actually causes an E-field un-alignment. The field in the substance is turned sideways or orthogonal to the E-field, and so conduction is not helped. The conduction path is greatly *lengthened*, which of course must affect what they call permittivity.

To understand the mechanics beneath this problem of the dielectric, we have to look at the nucleus of an insulator. Let us take Sulfur as our insulator. This is how I have diagrammed Sulfur previously:



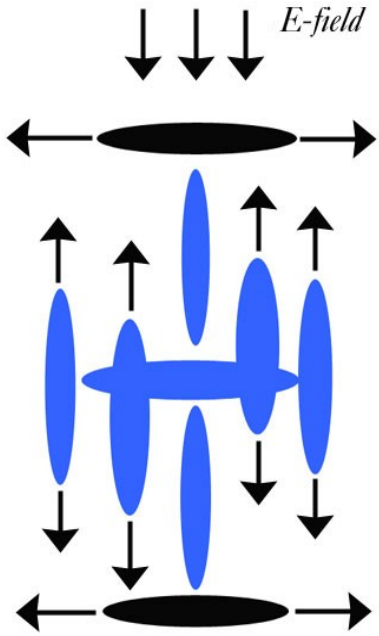
Again, the blues are alphas and the blacks are single protons. I haven't bothered to include the neutrons here, since they don't impact this question. You can see that Sulfur looks a lot like a noble gas. All the noble gasses have that same basic structure, with outermost disks perpendicular to the ambient field. For example, Argon is that same diagram all blue. Noble gasses are insulators, too, and they are insulators for the same reason Sulfur is. Notice there are no disks pointing out into the field, as we saw with the diagram of Iron above. All of Iron's outermost disks are parallel to the ambient field, while Sulfur's are all perpendicular. What this means as a matter of charge channeling is that Sulfur is channeling weakly, since those protons top and bottom are not pulling in charge very efficiently. I have recommended you think of the disks like charge fans, and the charge fans of Sulfur are turned the wrong direction. Rather than helping the charge vortex top and bottom, they are actually acting as a sort of wall to it. Instead of charge being directed into the pole or axis of the nucleus, charge is being sprayed out laterally. Some charge will still get in the hole (that is understood to be in the middle of each disk—see previous papers), so Sulfur is not as neutral as the noble gasses. That blue disk on the pole will be pulling charge in, and the black disk can only block or redirect about half of it. So Sulfur is still a charge entity. But the redirection is precisely what makes Sulfur an insulator (see diagram below for more on this).

Now, let us apply a current E to Sulfur and see what happens. Unless we focused the current using another nucleus (like we did with Fluorine to get charge into Xenon), that current (or more precisely, the charge carrying it) isn't going to be able to get into the hole of Sulfur. The vortices top and bottom of Sulfur are too small and weak to accommodate an unfocused current. Therefore, the current is just going to blow by the normal charge channels of this nucleus. But it is even worse than that, because the nucleus will naturally align its own charge *emission* to the charge field being carried by the E-field. Note that: emission. Normally, nuclei align their *intake* vortices to incoming charge, but since Sulfur cannot do that, it does the next best thing: it aligns its emission field to the incoming charge field. You might think Sulfur would turn 90 degrees to do that, but no. See the diagram below and notice that the carousel level alphas are also perpendicular to the ambient field. This means that Sulfur is actually emitting its charge N/S in a circle, from the carousel level. This is opposite most elements, which emit from the carousel level E/W in a circle. They have protons or alphas plugged in out there and pointing out, as you see in my diagram of Iron above.

So if we let our E-field come straight down from above, Sulfur wouldn't turn at all to align to it. It would already be aligned to it, as a matter of emission. Any nuclei that weren't already standing straight up would turn to stand straight up, to align to E, and that is what the mainstream means when it

talks of “alignment.” But you can see they don't have the mechanics right. Although the element or substance *is* aligned to the E-field (in this case), the element is doing little or no conducting. Conducted charge is charge that is channeled through the nucleus, and thereby strengthened. We don't have that here, as you see. But we also don't have “an internal electric field which reduces the overall field within the dielectric itself.” What we have, physically and mechanically, is a blocked E-field.

Why? Because we now have to look at the nucleus and the E-field after this alignment or coherence has taken place. If we have our E-field in line with the nuclear pole, then we have to take another look at that top proton of Sulfur, which is sideways to the field. Although it is positioned north, it is emitting E/W in a circle. Well, that emission will have to interfere with the E-field coming down from the north.



By drawing all the vectors, you can see the problems Sulfur has as a charge entity. It is an insulator precisely because of all these interfering charge vectors. The noble gasses all have this very same problem, but worse.

You will say, “Why doesn't Sulfur just align the top and bottom protons with the E-field? If E is coming down from the north, the top proton is the first thing it meets.” That doesn't happen because it isn't a matter of which is first, it is a matter of which is strongest. Notice we have four blue alphas emitting N/S. Since the blue disks are understood to be twice the black disks, the four blue disks have four times the charge strength of the two black disks. Therefore the E-field must align to them. But then the E-field also has to deal with the two black disks, which do act to block or dissipate it.

And we have even more blockage of the E-field than that. Notice that the carousel alphas are emitting up as well as down (and in a circle). Although those vectors are in-line with the E-field, they are anti-parallel. Which means any charge moving up will interfere with the E-field coming down.

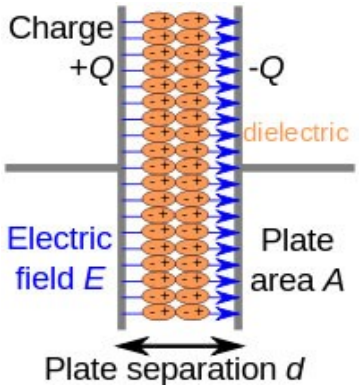
This is the physical cause of permittivity. Not only is the applied current not conducted, it is partially blocked. The element will still contain the charge and its ions until they escape*, which is why the mainstream says the insulator has an “internal electric field.” But since the blocked current no longer

has a direction, it isn't really current anymore. It is *potential* current, because it has energy and can become current again if it is directionalized. But since the insulator has pushed it in many different directions, it can't produce either what we call current or what we call magnetism. Although it has a certain kind of coherence, it doesn't have any alignment that could cause conduction, through charge, or magnetism.

Now that we have seen how the dielectric really works, we can return to the name change. Since most through charge or current is actually prevented, we should rename the dielectric the anti-electric. It is not a through-electric, it is a blocked electric. If anti-electric is too strong, we could use adverso-electric, shortening it to adelectric. Electric comes from both Latin and Greek, so we could use either prefix.

I will be told that just matches the definition of "insulator," and that my mechanics above explains why Sulfur would be an insulator but not why it would be a dielectric. We not only need blocking of current, we need energy *storage*. We are told that polarization causes this storage capacity, but again the mechanism is vague, not to say lacking. Precisely how would polarization cause energy storage? Well, I think you can already see how Sulfur would store energy in my field: it lengthens the path for charge and current to escape, so more more charge and current remain in the substance during each dt. But to find out more, let us study the mainstream explanation of a capacitor.

To do this, we return to the diagram under title:



The capacitor uses a dielectric substance in between the plates, to increase the effect. As you see, they have just drawn a lot of their little fake eggs in there, as a pseudo-physical explanation. But if we study their diagram closely, we see it only begs the question: if the eggs are polarized or aligned like that, why isn't conduction created? The blue lines are passing straight through left to right, and the aligned charges are also on that line. Shouldn't that enhance conductivity? When they draw the same sort of polarization with domains, the alignment increases the field effect. Here it does the reverse. Why?

I will be told that it is because they have drawn the E-field left to right, but the eggs are polarized right to left. Internal E is arrayed against external E. But as I have shown, that is just a push. It was created by a fake manipulation of a fake electron cloud, and it doesn't exist. By consulting my nuclear diagram of Sulfur, we see that no such reverse polarization is being created. Depending on the direction of E, its charge profile, and the initial state of the given nucleus, the nucleus *may* flip initially to try to facilitate channeling, but even if this flip occurs, it is not the cause of the insulation or storing. In my diagram of Sulfur above, we could flip the nucleus over and it wouldn't much matter. I have previously

defined the poles such that photons go in the south pole and antiphotons go in the north, so if E is composed mainly of photons, the flip will help conduction a little. But all the redirections I showed above will still occur, which means the insulating and storing capabilities of the dielectric will hardly be affected.

To understand this better, let us look at something the mainstream admits about the dielectric:

Dielectric materials used for capacitors are also chosen such that they are resistant to ionization. This allows the capacitor to operate at higher voltages before the insulating dielectric ionizes and begins to allow undesirable current.

Of course this brings us back to what I said above about the electron cloud being pushed over to one side by the E-field, to create the egg-shape. A de-centered cloud should be less stable, not more. But here they are admitting that dielectric materials are actually *more* resistant to ionization. That is illogical. If the E-field is pushing the cloud over to create the polarization, then higher voltages should create very large E-fields. And those fields in turn should stretch the egg even more. The more the egg is stretched, the less stable the orbitals should be, and therefore the *less* resistance to ionization we should see. Again, they are telling you that these stretched out clouds are more resistant to ionization than the original clouds! If that is so, then we may ask why the clouds would return to their original shapes when the E-field is removed? Aren't we taught that these electron configurations tend to the lowest energy levels, and the most stability? But if the clouds were more resistant to ionization when stretched out, *then they were also more stable*, by definition. That is how we define stability with regard to an orbital or cloud. An electron is either in a stable orbital or it is ionized, right? So the definition of a stable orbital must be that it is a path or probability that best avoids ionization. And yet here we see electrons pushed out of stable paths by E-fields and becoming *more* stable. That is what I mean by these theories ignoring their own field definitions. They are upside down to their own first postulates most of the time, but they just ignore it and go on.

My diagram of the Sulfur nucleus gives us the easy answer to why the insulator is not ionized. Normally, ionization takes place when the ambient or applied charge field is channeled through the nucleus. Since the entry for this channel is at the pole, it is the pole electrons of the element that are ejected or "ionized" when the new strong charge enters. They are blown out of the hole by the incoming stream. But since the top proton is resisting most of the charge of the applied E-field (not letting it in), the electron in that top eddy will not be blown out. It *won't* be ionized. *This* is the physical cause of resistance to ionization by a dielectric, not any fake egg-shaped cloud.

In fact, experiment confirms my analysis and refutes the current analysis, since if we switch the direction of E through the capacitor, we don't find conduction. If that mainstream capacitor diagram were correct, we should be able to reverse E and get conduction. Internal E would then match external E. I will be told that the clouds would return to their original shapes before you could make the switch, preventing that, but why would that happen? If the new egg-shape resists ionization better than the old shape, why would the cloud return to the old shape? Aren't we taught that the electron resides in the orbital in order to maintain the greatest stability? So the orbital is "chosen" by the electron or field in order to prevent ionization, right? The electron is either in an orbit or it is ionized, so if it is in an orbit, it must be resisting ionization the best it can. If so, then it should remain in the orbit or cloud that best resists ionization, which we have been told is the egg-shaped orbital of the dielectric.

Besides that, we know that insulators *don't* return to their original configuration immediately. What is called "relaxation" takes some time with an insulator, plenty of time for us to reverse E in a real

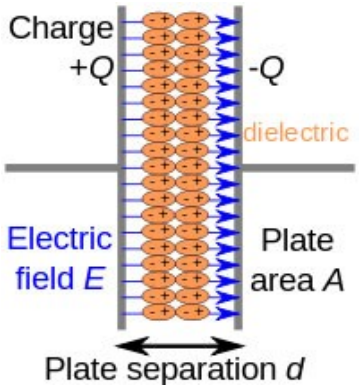
experiment. What we find is that the dielectric does not then conduct from the other side, as we would expect if this mainstream capacitor diagram were correct. In other words, we *know* that the atoms are not polarized like that. They are coherent, as in my diagram, but they are not polarized, as in their diagram.

As you see, my theory explains this without any hemming and hawing. We can reverse E without affecting conduction, because it doesn't matter how the element is polarized. All that matters in my diagram is the coherence or alignment, but we can have either the south pole or north pole pointing up. Remember, my polarity has nothing to do with electron clouds, or electrons at all. Please notice that I solved this mechanically without once talking about electrons in the atom. I have shown it simply doesn't matter what the atom's own electrons are doing. The field is created by charge channeling, and as usual the electrons are just along for the ride. The electrons don't determine *any* of the results, here and in most other experiments.

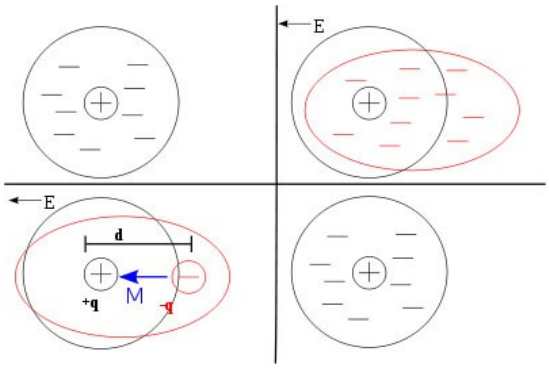
The other thing that confirms my analysis is this "little bit" I just showed you. It turns out that reversing E does make a small difference in experiment. It doesn't create conduction in an insulator, but insulators do have a slight polarity or non-symmetry, and they know this. They try to explain it with more quantum mechanical pushes, but it is explained by the local configuration of any charge field. As I first showed in my paper on beta decay, the Earth's local field is not balanced in terms of photons and antiphotons. We have more photons, and this causes the non-symmetry in beta decay. What this means here is that the E-field produced in any experiment on Earth is very likely to be skewed toward photons. Our current E will contain more photons than antiphotons in the charge field that is driving it. So the polarity of our Sulfur would matter a little bit. If we get the right pole pointing toward the E-field, we will get a very slight conduction boost. It won't be much, because all the problems I pointed out above still exist. The top proton is still perpendicular, so the vortex there is weak, and so on. In most experiments, the non-symmetry is too small to notice, but it becomes more obvious in experiments with insulating elements when the scientists are playing with a small number of nuclei, or just one.

So you have seen that my explanation of capacitance is far superior to the current one, not only in terms of diagrams, but in terms of matching a wide range of data. I don't need any of the tricks of the mainstream since I don't use electron orbitals or electron motions to explain any of this. It is the nuclear make-up of the atoms involved that causes capacitance, not electron orbitals, clouds, or manufactured polarization. Hopefully you can see that if we use Sulfur as our dielectric here, it easily explains the storing of charge. Since current is both charge and the ions carried by that charge (normally free electrons), both the charge and the ions are going to be redirected by the nucleus. You will say that charge should be moving c, which means it should get through the substance nearly instantaneously regardless of path, but we know that isn't true. All substances slow the transmission of both visible light and charge. That is because there are so many atoms in a substance, and therefore so many redirections. The path becomes *very* much longer, so even the photons are kept in the dielectric longer. Since the ions are going slower than the photons, this applies to them even more. It is mainly the energy of these ions that is stored. So current is kept in the dielectric material simply by redirections. The longer it is kept in, the more storage we have, and thereby the more capacitance.

With this in mind, return to the mainstream's diagram of a capacitor. They have drawn the internal field pointing opposite to the external field, in a line. E is moving to the right, and the minuses are to the left.



Even supposing that explained the blocking of current, how would it explain the storage of current or energy? This schematic doesn't provide us with a longer path, does it? I showed the storage was explained by a longer path through the dielectric. How does this diagram explain it? How does the mainstream explain it? In the rare case that they bother to try to explain it, all we get is that energy is stored in that dipole moment, by that potential vector M. We are told it is like energy stored in a spring. But since I have already shown that all those vectors are manufactured from nothing, we know that the energy is not stored like that. If it were, then when E was turned off, the dielectric would release all the energy stored in that vector. The spring would release, in other words. That isn't what we see. Since the electron cloud is very near the nucleus and the electrons are moving very fast, that spring should release almost instantaneously. How long would it take for an electron to travel the length of that blue vector M?



It would have to be on the order of 10^{-16}s, or less. Again, that isn't what we see. The so-called relaxation time can be quite large for insulators.

In my analysis, this is again easy to explain. The relaxation time for an insulator is the time it takes for the applied E-field to dissipate and for the normal ambient charge field to return to pre-experiment levels. This takes longer for an insulator precisely because the paths are longer. It must take longer to clear a longer path than to clear a shorter path. By the same token, relaxation time is faster for a metal because in that case we have conduction. With conduction, the paths are shorter since they go straight through the nuclear axis. And it is faster for a second reason: conduction not only allows for straighter and shorter paths, it actually augments the speed of conduction of ions. If charge is moving by more direct paths, then the ions being carried by the charge streams will seem to be accelerated. The photons can't move faster, but if the photons are moving by more direct paths, the ions *can* move faster. The ions are not already at c, so they can be accelerated. This is what is happening with the short relaxation

time of conductors.

*Charge may be de-spun—losing its magnetic component—but it is never destroyed.
**They will try to tell you they have quantum mechanical answers for these things, but they don't. The mathematical finesses become more complex, but they don't become more rigorous, sensible, or consistent. Just the reverse, in fact.