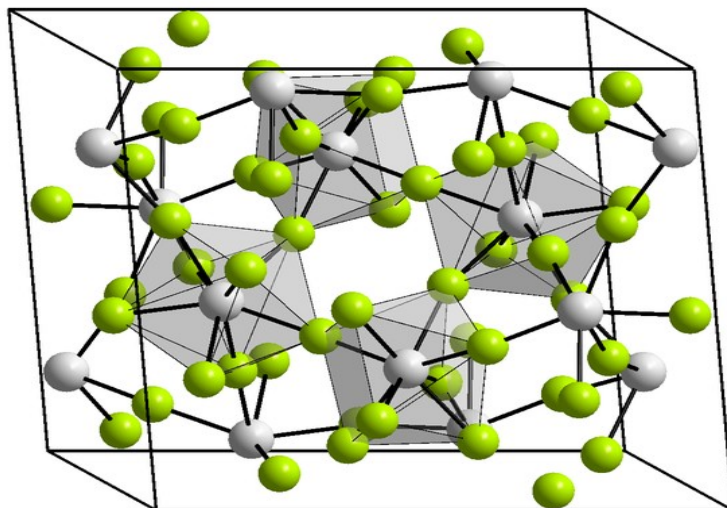


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# URANIUM TETRAFLUORIDE

*and other Fluoride Compounds*



*by Miles Mathis*

**[NOTE: You should have already read [my previous papers](#) on nuclear diagramming, in order to understand my method here.]**

On the recommendation of my good reader Michael Howell, I have been sent to look more closely at the Uranium tetraFluoride molecule.

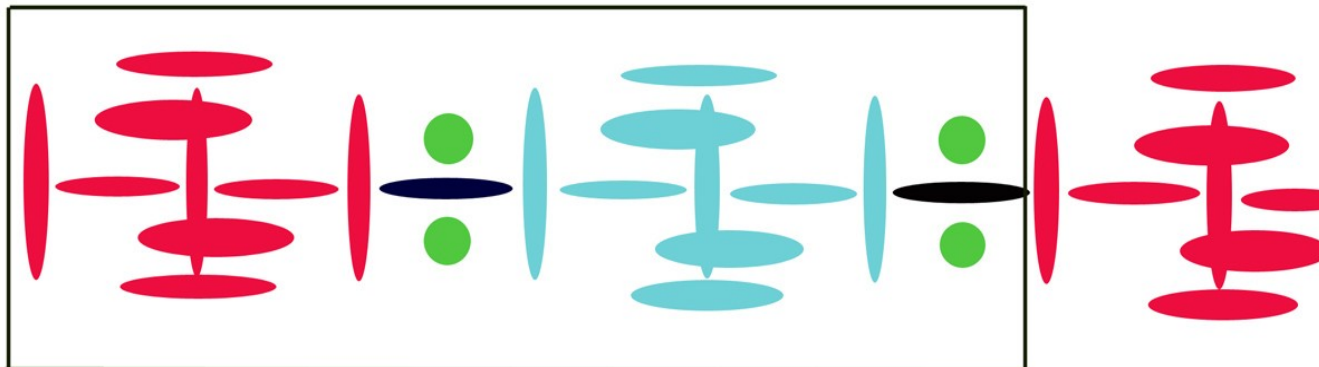
This is part of the email he sent me:

I have noticed that uranium tetrafluoride is actually in 8-fold coordination with the fluorine atom ([http://en.wikipedia.org/wiki/File:Kristallstruktur\\_Uran\(IV\)-fluorid.png](http://en.wikipedia.org/wiki/File:Kristallstruktur_Uran(IV)-fluorid.png)) [see diagram above]. Each fluorine atom is supposedly bonded to two uranium atoms! That should not be possible, according to general patterns in the standard model. However, your diagram of U-235 makes it easy to see how it could be done. U-235 has eight good prongs: four around the weak links and four around the xenon base. Four fluorine atoms should be more attracted to one set of prongs than the other. I believe it must be the weak links. The square antiprismatic structure (assuming its validity) must come from interference patterns in the charge field that must be diagrammed.

I suspect uranium pentafluoride is formed by first filling in the weak links and then adding one fluorine to the perpendicular axis of xenon. As for uranium hexafluoride, I wonder if the VSEPR model actually mistakes the long axis of uranium for one of the fluoride bonds.

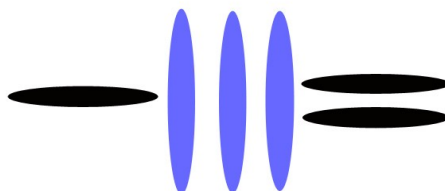
We will see that he is (mostly) correct. Even though his suggested diagrams aren't quite right, his recommendation that these Fluorides provide very convincing proof of my nuclear model is spot-on. Here is my diagram of Uranium-235 from [a previous paper](#):

*Uranium*



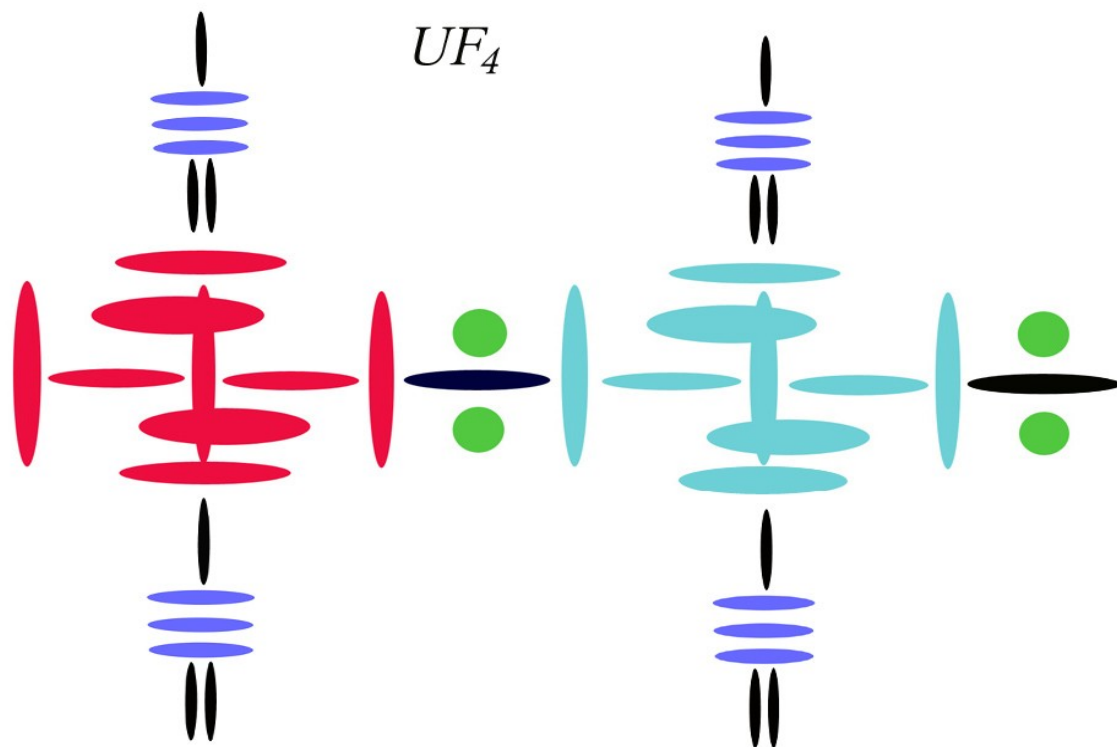
The red disk is two alphas, the cyan disk is three alphas, hence U235 is basically Krypton plus Xenon, with linking protons. Here is the nuclear diagram of Fluorine, with the blue disk being an alpha and the black disk being a proton:

*Fluorine*

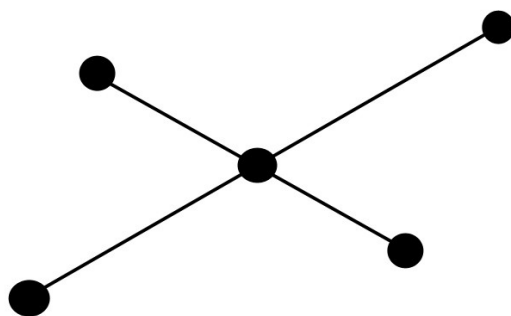


Now, Uranium has only one good prong, as you see, but it has a lot of open holes. Uranium has one good prong on the east end of my diagram—the black disk sticking out in the wind. But every other disk has a hole in the middle of it that is unfilled. If we count up the available outer holes in cyan and red disks, we get, yes, eight. That would be four in the Xenon part and four in the Krypton part.

It is Fluorine that has the prongs. It has a single proton prong on one end and a double prong on the other. I could draw that double prong as a blue alpha, but I will keep it as two protons so that we can see the double prongs at all times. A single molecule of  $UF_4$  then looks like this:



Notice that this structure allows us to plug in four more  $UF_4$ 's around this central one, giving us five total. That would be one top, one bottom, one front, and one back. In that case, each Uranium has only four Fluorides to itself, as illustrated here, matching the experimental findings. So the central structure of  $UF_4$  must be five Uranium atoms surrounded by 20 Fluorines. That is the building block of  $UF_4$ .

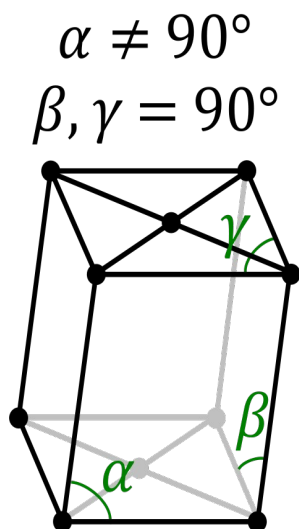


I have drawn only the Uranium atoms there, to simplify the model. This is both like and unlike the current model. One way it is unlike the current model is that we can clearly see that  $UF_4$  should still be fissile, and why. That is, it is still radioactive. Because that central bond between the Krypton and Xenon is now shielded by surrounding atoms, a good deal of the external charge field is blocked. But with a strong enough external charge field that is neutron-rich,  $UF_4$  should be fissile. If the neutrons are *aimed* between atoms, and the external charge field is aligned to that same opening, this increases

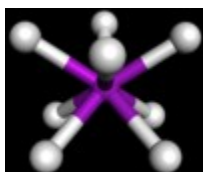
the odds of fission. Of course the current model understands that  $UF_4$  is fissile, but, as with Uranium, it can't tell you precisely why. I have done so.

Another way that this model differs from the current one is the relatively weak bonding side to side. As we see,  $UF_4$  bonds strongly (with double bonds: two Fluorines) in the z-plane and y-plane, but weakly in the x-plane. When creating a solid structure, it is bonded only by that single proton between the Xenon and Krypton. Breaking that external bond doesn't imply radioactivity, but it does imply a weaker structure in the x-plane. This means 1) it should cut more easily in one plane than the other two, 2) it should conduct well in two planes and poorly in the third. It should conduct best top to bottom (z-plane), second best in the y-plane, and worst in the x-plane.

This brings us to a major problem with the current diagram under title. They just draw a parallelepiped around four square antiprisms, but the structures make no sense. That diagram is a mess, as I think just about anyone can see. They are forced to draw such a mess because in reality square antiprisms bonded at each point can't create a square structure. Remember,  $UF_4$  is supposed to form a monoclinic structure, where two of the three angles are 90:



Square antiprisms can't actually create that structure, so they just fudge the diagram to make you think they can. Try stacking square antiprisms. Here is your building block:



It is clear at a glance that you can only create one-dimensional chains. In other words, you can stack up and down, but not to any side. You can't build a monoclinic structure that way. You can't even build a solid that way. Your chain will also twist, which doesn't fit the known structure, either.

But my diagram *does* fit the monoclinic structure. The building block of the crystal lattice isn't the single molecule, it is the 5 U, 20 F structure I described above. Just look at the monoclinic diagram above, especially the top, where the five points in plane are drawn. Those are my five Uranium atoms.

Since my building block isn't a square antiprism, it naturally creates a monoclinic structure, without any fudging. It also matches the angles in the diagram perfectly, since we get  $90^\circ$  angles among the five Uranium atoms in the plane. But since I just showed you the Xenon-Krypton bond was weaker, it will cause an angle less than  $90^\circ$  at  $\alpha$ .

To see this, think of a stack of Pringles potato chips. We stack our  $5\text{-UF}_4$ 's like a stack of Pringles, each  $5\text{-UF}_4$  being one chip. But the chips are bonded poorly to one another, so there is more give between them. The stack is prone to lean. Well, the external Xenon-Krypton bond between  $5\text{-UF}_4$ 's is like the bond between potato chips. It is weaker than the other bonds, so any pressure on the structure will show there first. Any unequal pressure from the ambient field will cause a lean.

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Now let's look at what Howell says about Fluorine bonding to two Uranium atoms. According to the current models, that is very hard to explain, but with my model, it is simple to explain. Why? Because once we understand that every nucleus is channeling charge in a particular channel *and in a particular direction*, we can understand how Fluorine channels charge from one Uranium atom to the other. Notice that I have modelled the Fluorines differently in different holes. In some holes the Fluorines have the single prong on the inside, but in other holes the double prong is on the inside. This is because charge channels through the Fluorine atom from the two side to the one side. Think of each proton as a fan. Two fans pull more charge than one. So the charge goes in one end and out the other.

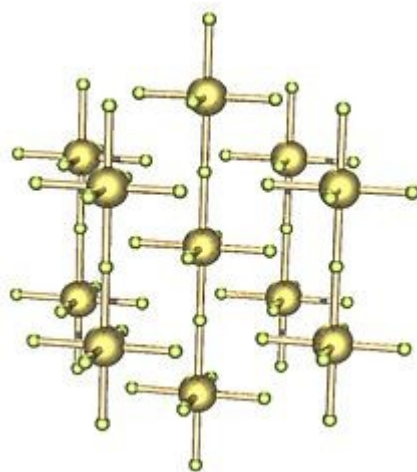
Well, that also has to be true after we plug the Fluorines into the Uranium. We can't have all the Fluorines pulling charge *into* the Uranium nucleus, because then the nucleus would explode. One Fluorine must pull in while the opposite Fluorine pulls out. That is why I reverse the Fluorines top and bottom, for instance. **We have to create a channel at all times, with all molecules and all combinations of molecules.**

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Now let us look at  $\text{UF}_5$ . I would diagram Uranium pentaFluoride by putting Fluorines in those last two holes to the side, along with the single protons (x-plane). Remember, those holes that the single proton is filling can take a maximum of four protons if the disk is blue and six if the disk is purple. So we can easily slip Fluorines in there. This makes our central structure or building block five Uranium atoms bonded to 25 Fluorines. This gives  $\text{UF}_5$  the stronger x-plane bonding that  $\text{UF}_4$  lacked. [see diagram below of  $\text{UF}_6$  if this paragraph didn't create a visualization for you.]

In the current model, we are told that the  $\beta$ -form of  $\text{UF}_5$  has the same square antiprism structure as  $\text{UF}_4$ , but I have just shown you that it must have the same monoclinic or orthorhombic structure instead. Neither  $\text{UF}_4$  nor  $\text{UF}_5$  is square antiprismatic. You can't create the known structure of the  $\beta$ -form with a ten-point square antiprism, so I don't know why they tell us you can.

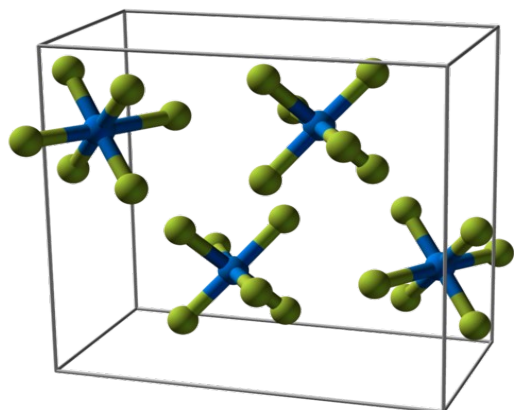


The diagram above is the current one of the  $\alpha$ -form of  $\text{UF}_5$ , which the  $\beta$ -form goes to above  $180^\circ\text{C}$ . But, again, that doesn't make any sense. Why? Because it contradicts the diagram of  $\text{UF}_4$  under title. You can see the problem just by counting bonds. In the diagram under title of  $\text{UF}_4$ , each Uranium is bonded to eight Fluorides. In the diagram above of  $\text{UF}_5$ , each Uranium is bonded to six Fluorides. So  $\text{UF}_5$  has fewer bonds than  $\text{UF}_4$ ? That doesn't make any sense.

Think of it this way: the  $\beta$ -form of  $\text{UF}_5$  would have to be the compressed state of the  $\alpha$ -form, right? But if we link these  $\alpha$ -chains in three dimensions to create a solid, we have a problem. We are told that the  $\alpha$ -chains are created by links “in which one of the five fluoride atoms forms a bridge to the next uranium atom.” If we try to create bridges in the other directions in the same way to make the  $\beta$ -form, we either get overlapping Fluorides or we get too few Fluorides. To say it another way, we either have to lose a lot of Fluorides, which ruins our penta number; or we have to create a “bridge” by putting one Fluoride right up next to another. If we let the molecules share linking Fluorides as they do in the  $\alpha$ -chain, we get only three Fluorides to each Uranium, which isn't penta. But if we leave the diagram as is, simply lining up the molecules in a lattice, we have Fluorides bonding face-to-face. The current model needs to explain how and why the z-plane bonds are shared, while the x-plane and y-plane bonds are not. By only showing the  $\alpha$ -form, the current theory dodges the question.

In addition, they may have mistaken the “monomer” form of  $\text{UF}_5$  for a single Uranium atom, when it is really five. The five-point structure of the monomer isn't created by five Fluorides around a Uranium atom, it is created by 25 Fluorides around *five* Uranium atoms. The Fluorides are small enough to be ignored in a generalized lattice.

Now we move on to  $\text{UF}_6$ . Here is the ball-and-stick model of Uranium hexaFluoride:

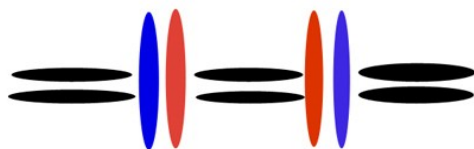


Pathetic, as usual. Compare that to the ball and stick model of Uranium tetraFluoride under title. Why are the molecules of  $UF_4$  linked, but the molecules of  $UF_6$  not linked? As you see, they appear to be free-floating. This despite the fact that  $UF_6$  is a solid below about  $125^\circ F$ . And if they are going to diagram it as a gas, why draw a box around it? You don't draw boxes around gas diagrams. The box is supposed to imply a crystal structure of some sort. And why are the molecules positioned like that in the box? There doesn't seem to be any rhyme or reason to it. The molecules are drawn like normal octahedra, but you don't stack octahedra like that. The faces or poles aren't even aligned!

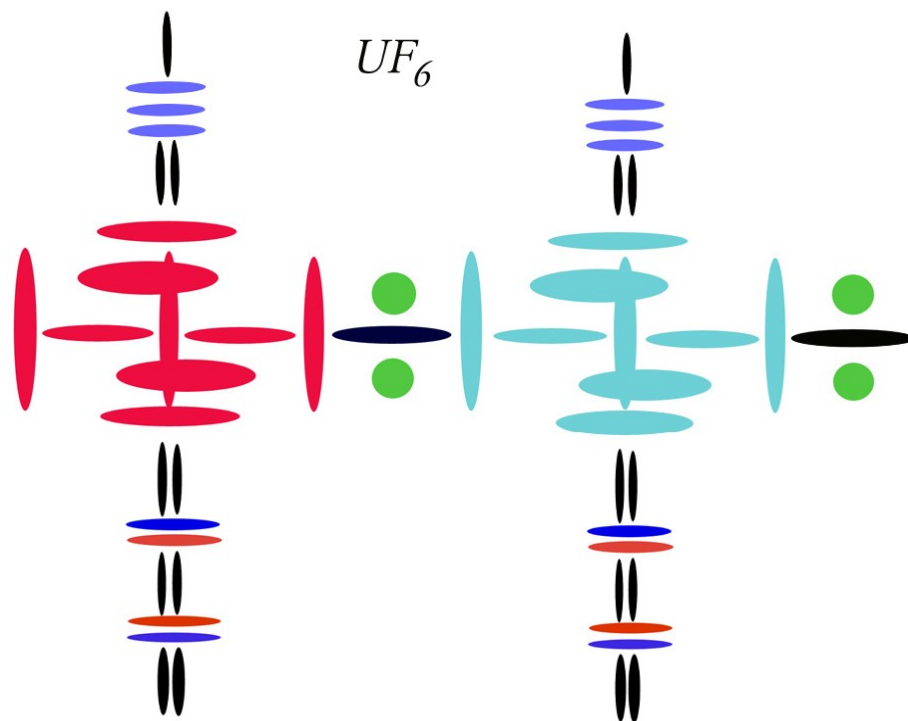
Another problem: that is the same molecular diagram as  $UF_5$ . Just look at the diagram before it. There,  $UF_5$  has *six* bonds from each Uranium. Here,  $UF_6$  has *six* bonds from each Uranium. Are we to believe that both are octahedral? Come on!

The real explanation of  $UF_6$  is that Fluorine can bond to itself.

*Two Fluorines*



So we just double that x-plane bond of  $UF_5$ .



That is the diagram of the single molecule of  $UF_6$ , showing all the bonds, but if we make a solid structure from it, only half of those Fluorides go to each Uranium, giving us half of those twelve diagrammed, or six to each Uranium. So you see that the structure of  $UF_4$ ,  $UF_5$ , and  $UF_6$  is not that different. Uranium hexaFluoride is orthorhombic, but that is very similar to monoclinic, the only difference being that all angles are orthogonal. I have already suggested the cause.  $UF_6$  has stronger bonds in the x-plane, as you see, making it more stable in all three dimensions.

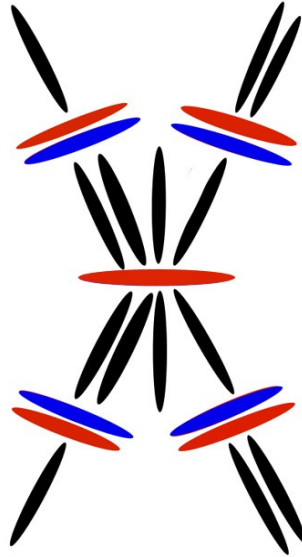
At Wikipedia, we are told:

It has been shown that uranium hexafluoride is an [oxidant\[6\]](#) and a [Lewis acid](#) which is able to bind to [fluoride](#), for instance the reaction of [copper\(II\) fluoride](#) with uranium hexafluoride in [acetonitrile](#) is reported to form copper(II) heptafluorouranate(VI),  $Cu(UF_7)_2$ .

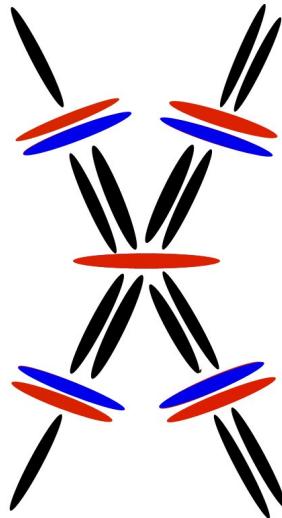
This is explained by my diagram as well. All the outer edges of UF (where UF isn't bonded to itself) will have "hanging" Fluorines, and these Fluorines can bond to other Fluorines or to any other nuclei with the proper holes or prongs. These bonds will be more likely at points where the Fluorines are channeling charge in, rather than out.

Now let us look at a less exotic Fluoride compound, Carbon tetraFluoride,  $CF_4$ , also known as tetrafluoromethane. I will draw the Fluorides in a more compact way this time, with one blue disk and one red disk; but that is still three alphas in the center of each Fluorine.

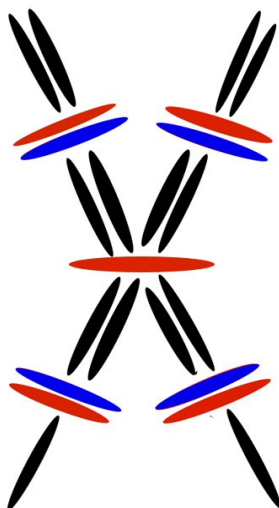




The central red disk belongs to the Carbon atom, as do the central two protons. A red disk stands for two alphas, so the holes in the red disk can take a maximum of four protons on each side. Our Fluorides initially plug in like this. But that free proton of the Carbon will actually turn to fit into the charge channel from the Fluoride, like this:



But according to my rules of channeling, that can't work, either. Why? Because charge would be going in both directions through the hole. That can't be happening, because the spin of the central red disk is determined by the direction of charge. The disk can't spin both ways at once. So, one of two things must happen. One, the red disk *does* stop spinning, and no charge is channeled out laterally (east and west, here). All charge is channeled northwest or southwest. Or two, the Carbon protons re-arrange themselves to get both black disks above the red one. It looks like this would require a re-arranging of the alphas, unless one proton could go *around* the alphas. In that case, we would get this configuration:



To discover which it is, we must study  $\text{CF}_4$  a bit more closely. It is known that Carbon-Fluorine bonds are the strongest in organic chemistry, and the tetra bond here is the strongest of the strong. This is currently “explained” by giving the Carbon atom a partial charge of .76, but once again that is a heuristic or mathematical explanation only. There is no mechanical explanation involved in the idea of partial charge or so-called Coulombic attractions. It is just giving names to things after the fact.

The idea of partial charge also contradicts the field definitions of charge, by which charge cannot be split. The fundamental charge cannot be split to suit diagrams, unless some mechanism or field explanation is given. The electron is the unit of charge and it cannot be split by any known means. That is to say, chemists have used the idea of partial charge without any confirmation or back-up from particle physics. In fact, quantum mechanics is proof against any idea of partial charge, or should be. Even Wikipedia is forced to admit:

Despite its usefulness, the concept of a partial atomic charge is somewhat arbitrary.

That is the understatement of the century. “Somewhat arbitrary”? It should say that the concept of partial charge is both *ad hoc* and falsified by all known data and all accepted quantum theory, but we use it anyway. Rather than give us some fudged quantum math like they usually do, Wikipedia simply says that partial charge is explained

because particles are not like mathematical points—which must be either inside a zone or outside it—but are smeared out by the [uncertainty principle](#) of [quantum mechanics](#).

So the uncertainty principle now smears out the charge value, allowing us to take whatever part of it we desire? These people are truly shameless. All you have to do is go to the Wiki page on the uncertainty principle to see that it is defined as the

fundamental limit on the accuracy with which certain pairs of physical properties of a particle, such as [position](#) and [momentum](#), can be simultaneously known.

There you have it. The uncertainty principle applies to particles, not charge. In the standard model,

charge is not a particle or a field of particles. If you want to get more technical about it,

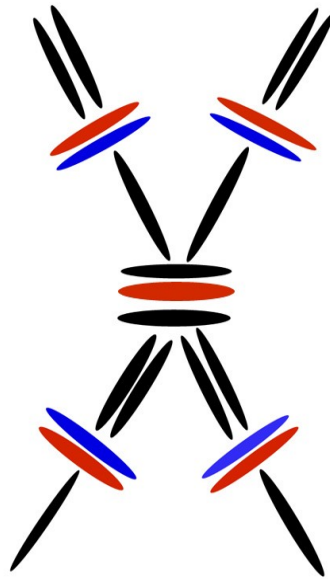
Mathematically, the uncertainty relation between position and momentum arises because the expressions of the wavefunction in the two corresponding [bases](#) are [Fourier transforms](#) of one another (i.e., position and momentum are [conjugate variables](#)). In the [mathematical formulation of quantum mechanics](#), any non-[commuting](#) operators are subject to similar uncertainty limits.

Charge isn't conjugate with anything in the wavefunction, therefore we cannot apply the uncertainty principle to charge itself. In other words, charge is what *causes* the energies in the Hamiltonian, not the reverse. Charge is not an outcome of position or momentum and so on, it is the cause of position and momentum. Charge isn't inside the wavefunction, it is *underneath* the wavefunction. It is the defining field of the operators, whatever they are, so it can't be conjugate with any other property.

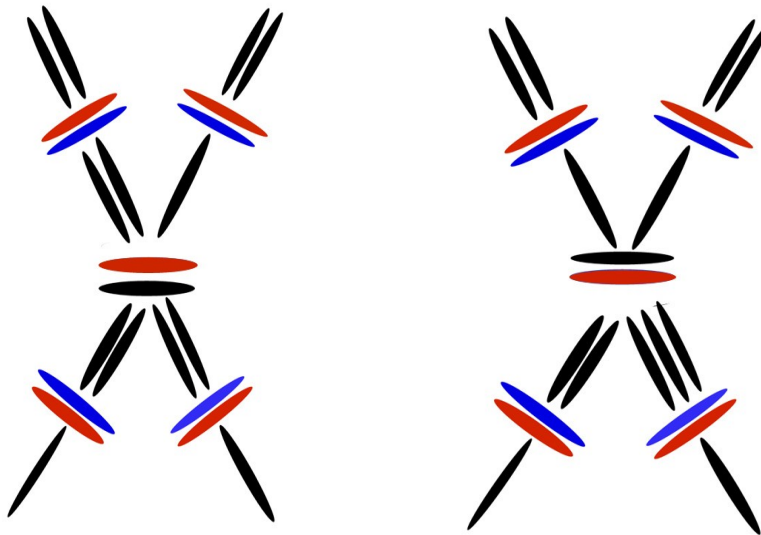
But if we look at my diagrams, we immediately see with our own eyes why the Carbon-Fluorine bond is so strong. It has nothing to do with partial charges and nothing to do with electrons. It is explained by protons in the nucleus. As we have seen, the hole in the central blue disk of Carbon is completely filled on both sides. The hole can take four protons, and it is filled with four protons. What this means is that charge is being channeled through this molecule as efficiently as possible. It is not possible to channel charge through any combination of alphas more efficiently than this. Another reason the bonds are so strong is the nearness of Carbon and Fluorine on the Periodic Table. In other words, it is important that the Carbon and Fluorine nuclei are so close to the same size. Charge is channeled efficiently because Fluorine was already channeling charge in almost the same amount as Carbon even before they came together. Neither charge channel was at maximum, since Fluoride was channeling with only three protons in a hole that could take six on each side, and Carbon was channeling with only two protons in a hole that could take four on each side. But notice that the fraction is the same: Fluorine is channeling at a strength of  $3/12$ , and Carbon is channeling at a strength of  $2/8$ . Both have a strength of  $1/4$ , you see, so they match even before they come together.

And once we plug the Fluorines into the Carbon, the channel through Carbon is at full strength,  $8/8$ . That is a maximum bond, and it explains the powerful bond at Carbon. Tetrafluoromethane is a gas, so it isn't a good conductor, but we can see that if it could be pressurized into a liquid or solid without taking it to near zero, it would be an incredible conductor. By that I mean that it is conducting charge through the molecule with an incredible efficiency. If charge *beyond* the molecule were also channeled efficiently, we would have a fantastic conductor. Of course even noble gases can be conductors at high pressures (and my nuclear models show why), but molecules like CF should be great conductors under pressure, since the pressure would close the gaps between molecules, linking the charge fields even without real external bonds.

But I still haven't chosen one model over the other. Is the correct one the second or third diagram? It seems at first that it must be the third. Charge shouldn't be channeled in both directions at once, unless we include anti-photons. Since we aren't doing that, I don't like the second diagram. It would appear that the charge field of Fluorine can overpower the charge field of Carbon, causing Carbon to rearrange its nucleus in response. I have previously shown how larger nuclei can influence smaller ones in this way. But my two suggested mechanisms above can't be right. The alphas can't be broken and rearranged, because that would imply rearranging the internal neutrons and electrons as well. We can't have that. We also can't have one of the plug protons of Carbon moving to the other side, because the protons couldn't get around the central alphas. The alphas are blowing out charge radially, and this would drive off the proton as it tried to go around. So that isn't a good mechanical explanation either. What actually happens is that we get this diagram:



Yes, the outer protons of Carbon turn to face the central alphas, allowing the Fluorides to plug in the correct configuration. In this diagram, charge will always be going from top to bottom. It may be that the top proton of Carbon doesn't have to turn, but one or the other must. These are also allowed configurations:

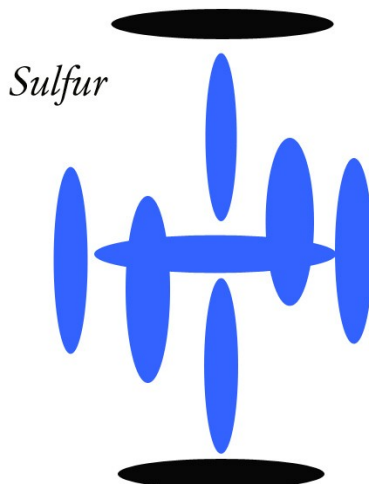


Since the central stack has five protons total, the hole can take a maximum of five prongs, allowing the second configuration. Those are allowed by the rules of channeling charge, but they may be disqualified based on symmetry. I think our best diagram so far is the one before these two.



So we see once again that the charge field of a larger atom can rearrange the outer protons of a smaller atom. Michael Howell suggested to me in his email that Fluorine is so powerful it may even be able to rearrange the outermost level of larger nuclei like Sulfur, but I was not ready to believe that. Let us finish by diagramming Sulfur hexaFluoride, to find out.

[In a previous paper](#), I drew two different forms of Sulfur, but that was Sulfur after it had been rearranged by a larger nucleus like Mercury. Here, we will start with the commonest form of the Sulfur nucleus (without being re-arranged by larger nuclei nearby):



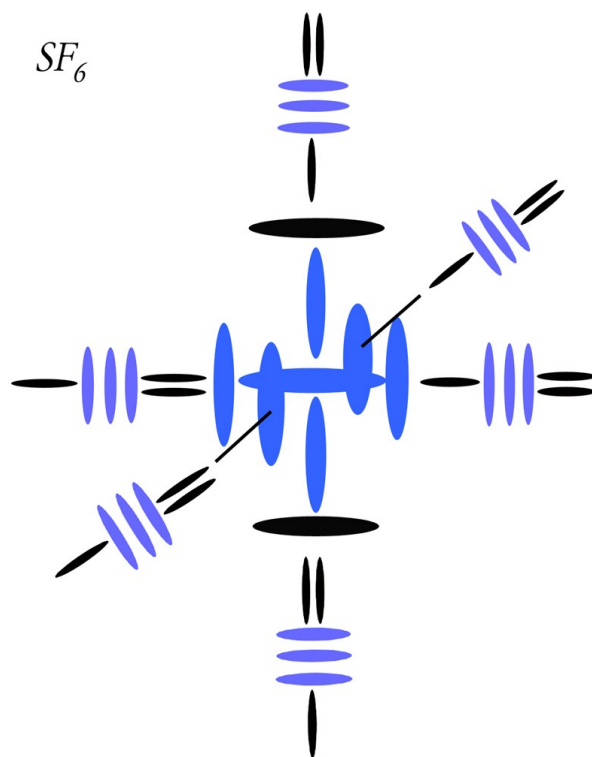
As you see, we have six outer holes just waiting for the six Fluorides of hexaFluoride. We have four open in the carousel level, and one top and bottom. We have so far considered the pillar holes to be somewhat special, so we don't include them here. They are “internal” in the nuclear configuration—as is clear from the diagram—and don't really count as “outer” holes here. They have their own rules of filling.

We could have predicted Sulfur's acceptance of the number six just by looking at Sulfur's position in the Periodic Table. Sulfur is six positions above Neon, so we should expect it to act somewhat like group 6, which all form hexaFluorides as well. That would be Chromium, Molybdenum and Tungsten. They all bond with hexaFluoride.

But it looks at first like Howell may be right, because that diagram has a problem. We encounter the same problem we had with Carbon. We need to create a charge direction, but if we put a Fluorine top and bottom, we find we can't put more than one prong in either hole. This would make one of our Fluorines plug in the wrong way. So we can't do it.

Or can we? It turns out we can, and the configuration tells us why. When we determine how much charge we can put into an outer hole, we look at how the holes are stacked. If we have a triple alpha in our stack, that tells us we can put six protons in the hole. We already know that. If we have a double alpha, the hole will take four. But in this case, we get to count all the protons and alphas that are stacked, even though they are separated by the turned pillar alphas. In other words, when we are looking at the charge being channeling *through the axis level*, we get to count the central alphas when determining our maximum charge strength. The charge field going through the axis isn't being recycled just by those cap level protons, so the charge isn't limited to one. If we count all the protons

stacked along the axis, we get four (the alpha at the center is two, and then one each for the black protons). But we have to look at one other thing. Because the charge is being channeled through those pillar alphas as well, they also limit the charge passing through the axis. They are what is determining the limit of charge passing through here, not the protons top and bottom. Since they are single alphas, our charge is limited at two. *We can't put more than two protons in the hole top or bottom.* And so this configuration is allowed:



That is allowed, even though we have two protons plugged in at the bottom. That molecule will have a charge negative top, right, and back, and a charge positive bottom, left, and forward. That is because the charge is being channeled from negative to positive.