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STAR FORMATION

by Miles Mathis

As I often do, I will begin my attack on this subject by analyzing the page at Wikipedia. The mainstream has claimed that my atttacks on Wikipedia are unfair and disingenuous, since Wiki is not peer-reviewed and can be written by anyone. But it is the mainstream's misdirection that is disingenuous. The physics pages at Wiki may not be formally peer-reviewed, but since they are written by the peers, this does not much matter. *All* of the important science pages at Wiki are written by the universities or other institutions, all are heavily policed and checked almost daily, and most are locked. If the mainstream doesn't want its propaganda analyzed, it should hide it away in the university libraries, in the peer-reviewed journals. But of course if it did that, the propaganda wouldn't really do its job, would it?

The first sentence on the page "Star Formation" under the heading "cloud collapse" is this one:

An interstellar cloud of gas will remain in hydrostatic equilibrium as long as the kinetic energy of the gas pressure is in balance with the potential energy of the internal gravitational force.

We are told that the density in these molecular nebulae is about 100 particles/cm^3, with a temperature of 10K. Already, we should have many basic questions, although these questions never seem to be asked by anyone. Assuming gravity only, and no charge field or other E/M component to the unified field, how can a gas in space have any pressure at all? Pressure requires containment, and we have no containment. That is precisely why the hydrogen is a gas and not a solid at this temperature. On the Earth, hydrogen is a solid below 14K and a liquid below about 20K, and so hydrogen would be expected to be a gas in space only because of the very low pressure. The hydrogen is molecular hydrogen, we are told, so the "particles" are molecules. They tell us these nebulae are very dense (for a gas), but 100 molecules/cm^3 is not dense at all. It is incredibly sparse. The hydrogen molecule is less than an angstrom in size, which is one ten billionth of a meter, which gives us a density of about 1 part per million, or 1ppm. First of all, that kind of density couldn't cause a temperature rise of 6K even if the gas were contained (the temperature of empty space is about 4K, according to current models). But the gas is uncontained. This means that the molecules should be free to disperse, and both the temperature and the density should go to zero over time. Since they are uncontained, why don't they

disperse? Why do they form into stars?

I will be told it is due to gravity. Gravity overcomes the gas pressure, and we no longer have "hydrostatic equilibrium." But we never had any equilibrium to start with, since the gas, being uncontained, can have no long-term pressure. Collisions should simply cause dispersal. And gravity is in no way able to balance or overbalance the internal pressure of an uncontained gas. This would be true even on the Earth, where we have much higher atmospheric pressure and gravity, but it should be blatantly obvious in space, where there is no atmospheric pressure to keep the gas from moving.

Think of it this way. Start with just the hydrogen gas, at the given density. Being uncontained, it is free to disperse, and its impulse is to do so. Any internal pressure or temperature it has due to its small density will just cause it to disperse *more* quickly, since any collision will cause an escape vector for both molecules. Applying either entropy equations or statistical equations will show a strong tendency to dispersal.

Now we add gravity. With no containment, gravity is the only force able to balance this double impulse to dispense. Unfortunately, it is incapable of doing so. If we apply normal gravity equations to these molecules, we get gravitational forces that are effectively zero. Remember, gravity is dependent only upon mass and distance. Not only are the molecular masses tiny, but the average distances are huge. It is not the absolute distances that matter to the gravity equations, you see, it is the distances relative to the size of the particles involved. Since the average distance between molecules is millions of times greater than the radius of the molecules (and this distance is squared!), we basically have 1 million squared in the denominator of the gravity equation. That's a trillion in the denominator, which means gravity is next to nothing. Even though the gas pressure is also next to nothing, gravity cannot balance it or overbalance it.

If you still believe it can, ask yourself this: if gravity between particles can prevent a gas from dispersing, why doesn't it prevent gases from dispersing on Earth? Take a container of hydrogen gas. If you remove the container, will the gravity between molecules prevent the gas from dispersing? Of course not. I will be told this is because the kinetic energy is too high, but that statement in itself conflicts with the mainstream explanation of star formation. Why? Because IF gravity could start collapse, as claimed, the collapse would cause both greater temperature and greater density, both of which cause greater kinetic energy. To reach the density of a star, the gas would have to pass through a density and temperature like the gas on Earth we were just looking at. If the gas starts off low density and temperature, and ends high density and temperature, it has to pass through *medium* density and temperature, no? But I was just told that gravity cannot prevent a medium temperature and density gas from dispersing. So how can this same gravity cause a gas to collapse into a star? In fact, the gas on Earth should be better able to collapse into a star, since at least the atmospheric pressure is preventing it from dispersing. In space, you wouldn't even have that. But we don't see hydrogen gases collapsing into stars, not with atmospheric pressure, not with containment in glass jars, and not even with added pressure and temperature. Gases simply don't act that way, and if they do, it can't be explained with gravity only.

Another problem is encountered when we remember that quantum physics tells us that gravity doesn't exist at the quantum level. We are told that gravity, IF it exists, exists at a level about 10^{-38} below that of E/M at the quantum level. Well, the molecular level isn't that far above the quantum level. The angstrom is 1 ten billionth of a meter, which is 10^{-10}. The quantum level is generally thought to be about 10^{-15}. So we are much closer here to the quantum level than the macrolevel. Why are we still talking about gravity-only at this level? Shouldn't quantum physics still trump gravity at this level?

Shouldn't hydrogen molecules display more E/M characteristics than gravitational characteristics? If not, why not, and at what level does the switch take place, and for what reasons?

Obviously, the reason the mainstream continues to try to explain star formation with gravitational collapse is that physicists can't figure out how to apply quantum equations to the problem. At this molecular density, the current theory can't make sense of the problem. Protons and electrons that far apart shouldn't be able to affect one another via E/M, since the field should have long dissipated. Super tenuous gases simply shouldn't be E/M structures, according to the standard model. That is why we get these ridiculous gravitational collapse models.

However, we see the same can be said of gravity. Super tenuous gases shouldn't collapse via gravity, and the only way to make them do so is by inverting logic. So we see a force that *should* cause more kinetic energy, and therefore more dispersal, instead cause collapse.

The second sentence of the "cloud collapse" section is this:

Mathematically this is expressed using the virial theorem, which states that, to maintain equilibrium, the gravitational potential energy must equal twice the internal thermal energy.

My readers will find this especially rich, since I have pulled apart both the virial and the Lagrangian. Here we see the virial once again screwing up something that was already screwed. As I have shown, the virial is historically derived from the moment of inertia, which means it only applies to systems with angular momenta. We haven't been told how or why these initial gases have angular momenta, or how they can be set up around a center, so the entrance of the virial is a mystery. As I have already shown in other papers, we have a question begging of the first order here, even without bringing the virial into it, since we require a center to postulate a collapse. What caused the center? An uncontained gas doesn't have a center. According to the current theory, you need a center to create a collapse, and a collapse to create a center. Gravitational forces between molecules cannot create a center in a super tenuous gas, no matter how large the gas field is. Bringing the virial into it only highlights this problem further.

But even if current theory were true and consistent, the claim above is illogical. Gravitational potential energy *increases* with distance between molecules. Remember, the further above the Earth you take an object, the more potential energy it has. So the gravitational potential energy and the internal thermal energy of a gas are in inverse proportion. As you raise one, you lower the other. The problem with that is that it doesn't fit the model we have been presented with. Wiki is trying to sell us a model whereby the collapse of the cloud is caused by gravity, and then it presents us with a variable (potential) which becomes *smaller* as the cloud collapses.

Beyond that, this use of the virial to represent thermal energy is bogus. The virial, like the Lagrangian, was created to balance gravitational kinetic energy and gravitational potential. This is the virial: $2K + V$. That comes from the Lagrange identity: $2K = -V$. I have shown that both are false, but even if they were true, the 2K variable would stand for gravitational kinetic energy, not thermal kinetic energy. Yes, modern physics has conflated the two, but they were not originally the same. And they cannot logically be the same. Heat cannot be the same as gravitational kinetic energy, and particle physicists —the lords of current theory—should know that. They should know it because they have thermal energy, or its quantum counterpart, at the quantum level, where gravity is said not to exist. And they use the virial and the Lagrangian at the quantum level. So how can thermal energy be the same as gravitational kinetic energy?

You see once again that these people don't even know the difference between gravity and gravitational potential, although the two are opposites. To see what I mean, we may look at the hydrogen gas in space. Even if the current theory were correct, gravity would tend to create kinetic energy with a vector pointing from molecule to molecule. That is, the *motion* of the molecules would be toward one another. This would be balanced by the thermal kinetic energy, which would tend to disperse the molecules. The motion of the molecules would be *away from* one another. Yes, greater heat causes more collisions, but these collisions then cause dispersal. The vector, drawn correctly, is not pre-collision, but post-collision. Under normal circumstances, heat does not cause clumping, it causes dispersal.

So gravitational kinetic energy and thermal kinetic energy are vector opposites. They cannot be equivalent. And so the use of the virial above is a hash. It is one more willy-nilly assignment of variables by modern physicists to suit themselves, with no theoretical *or* historical justification for it.

Now let us look at the next series of sentences at Wiki:

The mass above which a cloud will undergo such collapse is called the Jeans mass. The Jeans mass depends on the temperature and density of the cloud, but is typically thousands to tens of thousands of solar masses. This coincides with the typical mass of an open cluster of stars, which is the end product of a collapsing cloud.

None of that make any sense, either. As we have seen, mass can have nothing to do with it. It is not that "the Jeans mass depends on the temperature and density of the cloud," since mass, by definition, has no temperature or density dependence of this sort. That is, you can have any mass at any temperature or density. Mass has a dependence on these things only in the sense that mass can be written as M=DV. And, if volume is in inverse proportion to temperature, you could write that as M=D/T. But that is not a dependence, it is a definition. What we are talking about is the Jeans mass, and the Jeans mass is NOT dependent on anything, except matching this squishy theory to data. To see what I mean, we just look at the claim that the Jeans mass is "typically thousands...of solar masses." Why? Given a temperature and a density of the cloud, why should the cloud require a certain *total* mass to initiate collapse? Gravity has no cumulative effect, that we know of. The gravitational equations of Einstein and Newton don't approach any limit or converge in any way. Why should a small patch at a given temperature and density not collapse, but a large patch do so? This theory simply works back from the end product: the open cluster of stars has a mass of x, therefore the Jeans mass must be x. That's not a theory though, is it? It is just a description with big glaring holes in it.

We see that clearly in this sentence, hiding in the middle of the paragraph we are analyzing:

If a cloud is massive enough that the gas pressure is insufficient to support it, the cloud will undergo gravitational collapse.

That is illogical. Gas pressure is a function of *local* density and temperature, not of total mass. And besides, to lower the gas pressure, you have to lower the density, which lowers the mass per unit volume. This theory is lowering local mass, but raising total mass. And raising the total mass has no theoretical or mathematical justification. How does raising the total mass increase the local gravitational effect?

You see, this theory needs low local density to keep the pressure low, which must also *lower* the gravity. But they also need the gravity *high*, to cause collapse. They can't have it both ways, so they

do a double whammy on your brain. First by diverting you into gravitational potential, which goes up as gravity goes down; then by diverting you into total mass, which goes up even though local mass and gravity are going down. This is more sleight of hand by masters of magic. Gravity is going down, but they *tell* you it is going up. While they are singing you this magic song, they bobble your head with upside-down definitions and pushed equations, so that you can't remember which way is up.

In the very next paragraphs, they begin to tell you of black holes and supernovae and so on, and we now see why. Lacking any real theory, the best thing they can do is push you as fast as possible into sexy esoterica and trivial sidelights. For example, we get this:

Complicating this picture of a collapsing cloud are the effects of turbulence, macroscopic flows, rotation, magnetic fields and the cloud geometry. Both rotation and magnetic fields can hinder the collapse of a cloud.

Amazing. In two sentences, we not only get multiple misdirection, we also get black theory. What do I mean by black theory? I mean theory that purposely mentions the correct answer, but tells you it is the wrong answer. Most of modern politics is black theory, as is nearly all art theory. All the sciences are now heavy with black theory, since it is a large part of job protection.

Just reread that last sentence from Wiki and think about it for a moment. Rotation requires a centripetal force and a center, both of which would seem to help this theory, but we are shooed away from the idea. And magnetism is a force of attraction, but we aren't to consider it? Very strange. This bit of black theory can only be explained as a part of the mainstream's now pathological fear of the E/M field in celestial mechanics, since including it would destroy all their prize equations, back to Laplace, Lagrange, and even Newton. Since we have had clear data since at least the 1940's that E/M plays a sizable role in celestial mechanics, this continued refusal to admit it can only be called an illness.

The extent of this illness can be seen in the first sentence of the entire page at Wiki:

Star formation is the process by which dense parts of molecular clouds collapse into a ball of plasma to form a star.

They now admit the existence of plasma, and admit that plasma is an E/M entity, but somehow a gas collapses into a plasma with gravity only. As if the E/M field didn't exist in the vicinity until after the plasma was created, at which time it magically turned on. And the E/M field now exists only inside the plasma, but if the plasma as a whole interacts with another celestial body, it does so via gravity only.

So what is the answer that is being hidden here? Well, it isn't esoteric and it isn't difficult to comprehend. It is simply that star formation, like everything else, is a *unified field* phenomenon. The charge field (that is to say, spinning photons) is present at its usual strength in this problem, which is a strength that is about 19 times that of normal (baryonic) matter in the field. Meaning, as a function of mass equivalence, the photons in the area outweigh the hydrogen protons and electrons by 19 times. Or, 95% of what is happening here is happening in the photon field, so 95% of the answer here has been totally missed so far.

I have shown that mainstream theory and equations have contained this information almost in plain sight from the beginning. Just look at these three equations, which I have published in several papers before this one:

$e = 1.602 \times 10^{-19}$ C

$1C = 2 \times 10^{-7}$ kg/s (see definition of Ampere to find this number in the mainstream)
$e = 3.204 \times 10^{-26}$ kg/s

That means the proton is emitting 19 times its mass in charge every second.

Yes, I have shown that there is no "dark matter," there is only photonic matter, and this photonic matter exists everywhere, not just in esoteric places. In the vicinity of baryonic matter, these photons are recycled by the spinning protons and electrons (and other particles), and that is how they interact. And since photons move in straight lines very quickly, they can link together molecules or ions, even molecules or ions with a very tenuous density.

I will be told, "Wait, your charge field is repulsive, right? How can it help you here? You need more attraction here, but your charge field is arrayed against gravity. It can only make the problem worse." That is a perceptive question, but there is an answer. The answer is that the hydrogen gas is a plasma to start with. It is a cold plasma, but it is a plasma because the electrons and protons are disassociated by a magnetic field. Yes, the answer we were steered away from above turns out to be the correct one. Stars form in galaxies because the plasma requires the *magnetic* input from the galactic core. Which just means the cold gas needs to be bombarded by the right photons.

I will be told, "Fine, but ultracold plasmas don't collapse either. We still lack a mechanism of collapse, plasma or no plasma. And you haven't explained why the Jeans mass matters." Right. What does the big mass plasma do that the small mass plasma doesn't? Well, it isn't a matter of mass, it is a matter of volume and density. A big plasma has enough cross section to capture free electrons and other ions arriving from outside. Of course any part of the plasma can do this, but a big net is more efficient than a small net. Given a set of specific sources of radiation, this radiation may dodge a small net, but it is less likely to dodge a big net. The same applies to the density. A finer net is more efficient than a net with a looser weave. More ions must be captured. We must assume that given the distribution of radiation sources in our galaxy, the Jeans mass is the mass at which the plasma achieves an efficiency of capture of ions to initiate collapse.

And this means that the Jeans mass is not a universal constant. It depends on the galaxy and will vary from galaxy to galaxy. It is a function of the type and levels of radiation present, which means it is a function of the size and type of the galaxy.

OK, but that is still pretty fuzzy. How does this capture of ions initiate collapse? Why would a plasma capture ions at all? If the electrons and protons were prone to rejoin, why wouldn't the original electrons join, instead of new ones? And if they did join, wouldn't the photons just knock them apart again? Well, all that does happen, but because the gas remains ionized, it has a way of capturing other free ions. The plasma cannot tell incoming ions from its own ions, and since free electrons and protons attract one another, the plasma tends to gain weight, as it were. The charge field inside the plasma also tends to the same effect, since the spinning protons and electrons are recycling the charge field whether they are part of molecules or not. This means the charge field itself is denser and more magnetic inside the plasma than outside, so it tends to capture ions even without the ions being attracted to one another. We have a doubled weight gain.

Normally, this would make the plasma tend toward a molecular gas, since the electrons and protons would eventually join. But the high-energy photon traffic from the galactic core continues to knock the protons and electrons apart. So, up to a certain point, the plasma can continue to gain weight. Only

when the photon traffic can no longer ionize the entire plasma, do we have a limit to the weight gain. When this limit is reached, the plasma partially collapses, and it will now contain a portion of molecular hydrogen. The plasma portion continues the previous process of capture, however, and the weight gain continues. It continues until the entire original field has gained enough mass that gravity really does kick in and overpower the charge field repulsions. At that point we have the big collapse that we were trying to explain from the beginning. So you see that once again, we have a unified field explanation. We require both gravity and charge to explain star formation. As we have seen in hundreds of other places, gravity-only can't explain anything in celestial mechanics, except with a huge pile of mathematical cheats and fudges.

One last thing to touch on before I finish. The size of the molecular cloud may also matter due to curvature. Everything in a galaxy is orbiting the galactic core, therefore everything in a galaxy exists in a curve. You can think of this as Einstein's curved space if you like (although I don't really recommend it), or you can think of it simply as a curved velocity in a Newtonian field: either way, a larger object will have more curvature than a small one. In other words, the gas or plasma field we are studying is not flat or rectilinear, and the bigger it is (as a matter of cross section) the less flat it is. Well, the more curvature it contains pre-collapse, the more likely it is to collapse in a defined fashion, as about a center. This may be another explanation of the Jeans mass. Smaller clouds may indeed collapse given the right conditions, but if they don't have enough curvature to begin with, the collapse may defeat itself. In other words, the collapsing particles miss one another in the collapse, and simply disperse. For the collapse to form a pre-stellar object, we may require a certain amount of initial curvature, which would require a certain size. Otherwise the object is not able to find its own center, and the collapse isn't able to get any feedback.

I present these ideas as hypothesis only. I make no claims to having found the right answer. I suspect I am on the right track, but the right answer may vary from mine in important ways. That said, I think anyone can see that my proposals are already far more consistent than the mainstream proposals. The gravity-only theory of collapse was a non-starter from the get-go, and I have to believe most people know that, or can see it once it is pointed out. Gravity by itself has no chance of explaining star formation, not even with a million tacked-on pushes. We simply must look for some sort of unified field solution, one that includes charge. If my ideas are not correct, some set of equally simple ideas *will* be correct.