Response to Gary Hoge on Whether the Earth can be

the Center of Mass for the Universe

by Robert Sungenis

R. Sungenis: As you will see below, Mr. Hoge admits that the present laws of physics allow the Earth to be the center of mass for the universe.

Is it physically possible for the whole universe to orbit the earth?

by Gary Hoge

Gary Hoge: Normally, as you know, light celestial bodies orbit heavy celestial bodies. That's why the relatively light planets orbit the extremely heavy sun. But according to geocentrists, the extremely heavy sun, the planets, and even the stars and galaxies, all orbit the comparatively-miniscule earth. As Ken Cole has eloquently pointed out, this is a contradiction of Newton's second law of motion, and his law of universal gravitation. Or is it?

R. Sungenis: Well, as we will see, even though Mr. Hoge says that Mr. Cole put forth an "eloquent" demonstration that Newton's second law contradicts geocentrism, it turns out by his phrase "or is it?" that he doesn't precisely agree with Mr. Cole, since Mr. Hoge will go on to state that the Earth can, indeed, serve as the center of mass for the universe, and thereby admits that the sun can revolve around the Earth if there is a sufficient counterforce to compensate for the sun's force on the Earth. The question will revolve around whether Mr. Hoge is correct in assuming that no such counterforce exists. I will show that he is incorrect, and thus his and Mr. Cole's arguments fail to disprove geocentrism.

Gary Hoge: The geocentrists claim that it *is* possible for everything in the universe to orbit the earth each day, without violating Newton's laws. They say this happens because the universe rotates around its center of mass, and the earth just happens (by God's design) to sit right at that very spot. Robert Sungenis, president of Catholic Apologetics International, says:

From a geocentric point of view, the earth was created first and was the Center of Mass (Genesis 1:1-2). The other celestial objects were subsequently created (Genesis 1:14-17) and were placed around the earth with the earth still being the Center of Mass. God, as it were, calculated all the forces in the starry universe, and balanced them so that earth could be the center of mass. And then God set everything in motion, and it has remained so, just as Newton's laws of inertia state.1

R. Sungenis: First, let's clear the air a little about Newton's Laws. Present Big Bang Cosmology has a big problem with Newton's Laws, for it claims that the universe is expanding, but if it is expanding what is the force making it do so? According to Newton's second law, F = ma (force = mass x acceleration). In other words, in order to have an expanding universe (i.e., the force) you must have the proper amount of mass. But Big

Bang Cosmology doesn't have the mass it needs. In fact, with the little mass that is in their universe there should be no expansion but an implosion, and rather quickly. So what does modern science do in this dilemma? It creates the mass it needs. Yes, you heard it correctly. Big Bang cosmology says that the universe is composed of 95% "Dark Matter and Dark Energy." They call it "Dark" because they have never seen it. They say it exists only because they need it to fulfill their Big Bang expanding universe model. Why are these scientists so desperate? Because if they don't propose "Dark" Energy and Matter, then they will have to go back to pre-Copernican days when we believed the earth was motionless in the center of the universe. What most people haven't been told is that the expanding universe was created by Hubble, Lemaitre and Gamow when Hubble found evidence in his telescope that the earth was the center of the universe. You can read more about it in my book Galileo Was Wrong: The Church Was Right. It is the very reason that Hubble and Hawking said the following:

> "…Such a condition would imply that we occupy a unique position in the universe, analogous, in a sense, to the ancient conception of a central Earth.…This hypothesis cannot be disproved, but it is unwelcome and would only be accepted as a last resort in order to save the phenomena. Therefore we disregard this possibility...the unwelcome position of a favored location must be avoided at all costs... such a favored position is intolerable…. Therefore, in order to restore homogeneity, and to escape the horror of a unique position…must be compensated by spatial curvature. There seems to be no other escape." (*The Observational Approach to Cosmology*, 1937, pp. 50, 51, 58-59).

In order to attempt an escape from this implication, Hawking proposes an "alternate explanation":

> "There is, however, an alternate explanation: the universe might look the same in every direction as seen from any other galaxy, too. This, as we have seen, was Friedmann's second assumption. We have no scientific evidence for, or against, this assumption. We believe it only on grounds of modesty: it would be most remarkable if the universe looked the same in every direction around us, but not around other points in the universe" (*A Brief History of Time*, p. 42).

Interestingly enough, the opposite of a Dark Matter/Big Bang/Expanding universe is Geocentrism, so says an article in *New Scientist*:

> Dark energy is at the heart of one of the greatest mysteries of modern physics, but it may be nothing more than an illusion, according to physicists at Oxford University. The problem facing astrophysicists is that they have to explain why the universe appears to be expanding at an ever increasing rate. The most popular explanation is that some sort of force is pushing the acceleration of the universe's expansion. That force is generally attributed to a mysterious dark energy. Although dark energy may seem a bit contrived to some, the Oxford theorists are proposing an even more outrageous alternative. They point out that it's possible that we simply live in a very special place in the universe – specifically, we're in a huge void where the density of matter is particularly low. The suggestion flies in the face of the Copernican Principle, which is one of the most useful and widely held tenets in physics. Copernicus was among the first scientists to argue that we're not in a special place in the universe, and that any theory that suggests that we're special is most likely wrong. The principle led directly to the replacement of the Earth-centered concept of the solar system with the more elegant sun-centered model.

> Dark energy may seem like a stretch, but it's consistent with the venerable Copernican Principle. The proposal that we live in a special place in the universe, on the other hand, is likely to shock many scientists. ("Dark Energy: Is it Merely an Illusion?" *ScienceDaily*, Sept. 29, 2008, citing the article by Timothy Clifton, Pedro G. Gerreira, and Kate Land, "Living in a Void: Testing the Copernican Principle with Distant Supernovae," Physical Review Letters, 101, 131302 (2008) DOI: 10.1103/PhysRevLett.101.131302).

Gary Hoge: Is this possible? Well, let's see. First, you may be wondering what a "center of mass" is. The "center of mass," also known as the "center of gravity," is simply the center of all the material that makes up an object, or a group of objects. It's the point at which an object will balance. A tennis racquet, for example, will usually balance at a point on its shaft near the head. This is the racquet's center of mass. If you get mad and throw the racquet, it will rotate around its center of mass before it smashes into the ground.

A group of celestial objects, such as a star system, also has a center of mass. It is the "balance point" of all the objects in that system. A simple example is a binary star system, such as the one shown below.

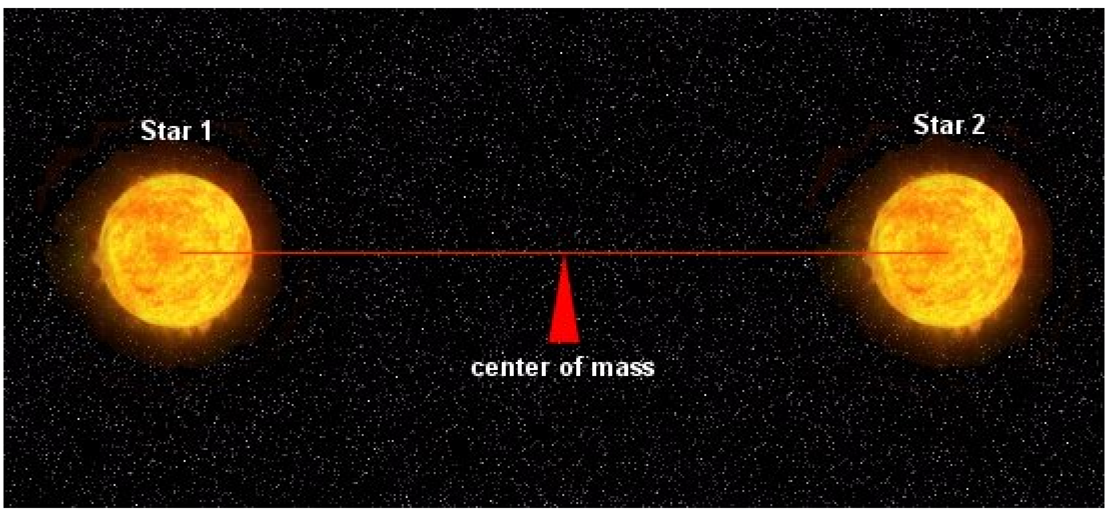

Figure 1: The center of mass (not to scale)

If the two stars in this system are equally massive, the center of mass will be exactly halfway between them. This is easy to understand if you imagine building a model of this system using two softballs held together by a metal rod. It should be intuitively obvious that if you tried to balance such a model on your finger, it would balance at the halfway point between the two softballs.

But what if the two masses aren't equal? In that case, the center of mass would be skewed toward the heavier object. In our solar system, for example, the two primary masses are the sun and Jupiter, as shown below.

Figure 2: The center of mass (not to scale)

The sun is over a thousand times more massive than Jupiter, and that skews the center of mass toward the sun, to a point just outside its surface. Again, this is easy to visualize if you imagine building a model in which a bowling ball (representing the sun) is attached to a golf ball (representing Jupiter) with a rod. Obviously, the balance point of that model would be very near the bowling ball.

Just like the tennis racquet that spins around its center of mass when thrown, every celestial system also orbits its center of mass. If our solar system consisted of just the sun and Jupiter, the point shown in the figure above would be the permanent center of mass of the solar system, and both the sun and Jupiter would orbit that point forever.[2]

Now, let's factor into the equation all the other planets, the stars, the galaxies, and every other object in the universe. Where would the center of mass of the entire universe be? Is it possible for the earth to be at the center of mass, as the geocentrists claim? Most of us would say that the earth isn't the center of *anything*. It's just a small planet that orbits a small star on the outskirts of a galaxy that isn't the center of anything, either. But the geocentrists say that the universe is really very different than we think it is.

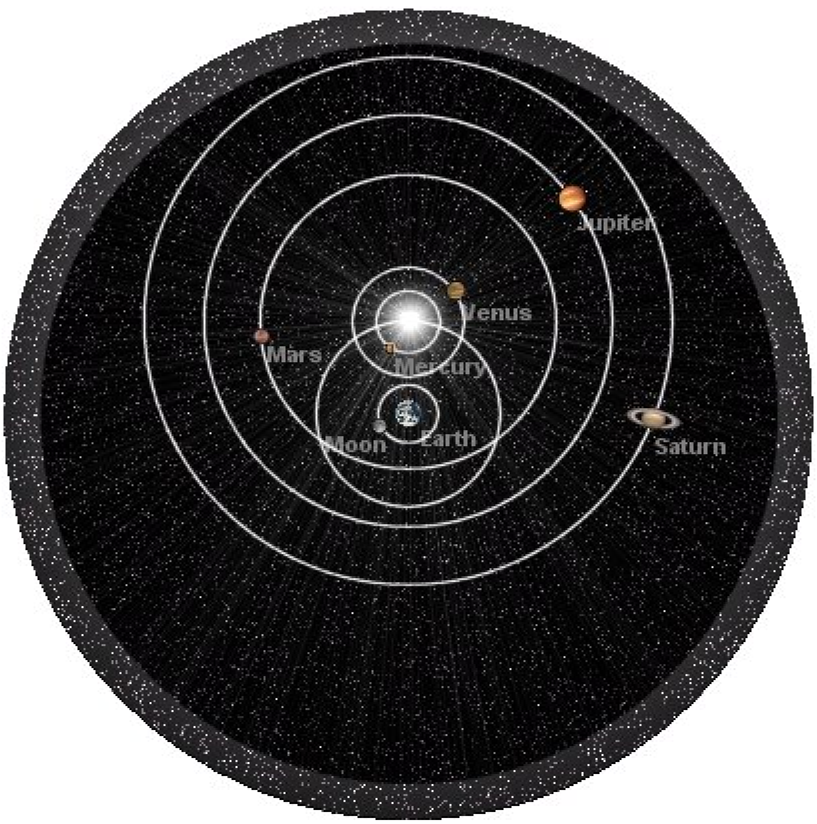

Figure 3: The geocentric solar system of Tycho Brahe (not to scale)

The figure on the left illustrates the geocentric universe as conceived by the great astronomer Tycho Brahe. Brahe, of course, knew of only the six visible planets, so the modern version of this model would have to be expanded to include the outer planets.

According to this model, all the planets except the earth orbit the sun, and the sun and moon orbit the earth. The stars, which are much smaller and closer than we imagine, form a spherical "shell" around the earth, as shown in the figure. Note that this figure is not to scale; modern geocentrists agree that the nearest star is about 4 light years away. However, they say that the *farthest* star probably isn't more than 300 light years away.

If the geocentrists are right about the nature of the universe, *would it be possible for the earth to be at the center of mass of such a system? The answer is, yes!* To make this happen, it would only be necessary to have some other mass balance the mass of the nearby sun and thereby skew the center of mass of the whole system out to where the earth is located.

R. Sungenis: So please take note that Mr. Hoge has admitted that the Earth could be the center of mass for the whole universe. I have italicized his words above to that effect.

Gary Hoge: To understand how this could work, pretend for a moment that the solar system consisted of just the earth and the sun. If that were the case, the center of mass of that system would be right about at the center of the sun, as shown below, because the earth has almost no mass compared to the sun.

Figure 4: Moving the center of mass

But suppose we put a relatively heavy planet near the earth. As shown in the figure below, its mass would skew the center of mass of the system away from the sun.

Figure 5: Moving the center of mass

If we kept moving that planet farther and farther away, the center of mass of the system would eventually coincide with the earth, as shown below.

Figure 6: Moving the center of mass

Now, remember that the nearest star is a whopping four light years away. At that distance, a small planet just 25% more massive than the earth would be sufficient to skew the center of mass of the whole system away from the sun and out to the earth. Therefore, if the mass distribution of the stars is just slightly lopsided in the direction opposite that of the sun, it would be possible that the center of mass would fall at the center of the earth, assuming, of course, that our solar system is at the center of the universe, as the geocentrists claim.

So far, so good. But here's where the geocentrists make a crucial error. Even if they were right about our solar system being at the center of the universe, they fail to take into account the fact that the universe is in a constant state of motion. The planets all move relative to the sun, and relative to each other, and over the course of a year, the sun moves all the way around the sky, relative to the stars. As all of these masses move relative to each other, obviously their combined center of mass is going to move too.

For example, I noted above that if Jupiter were the only planet in the solar system, both it and the sun would orbit a fixed point in space forever. But Jupiter *isn't* the only planet in the solar system. As the other heavy planets move to different positions around the sun, they cause the center of mass of the solar system to shift.

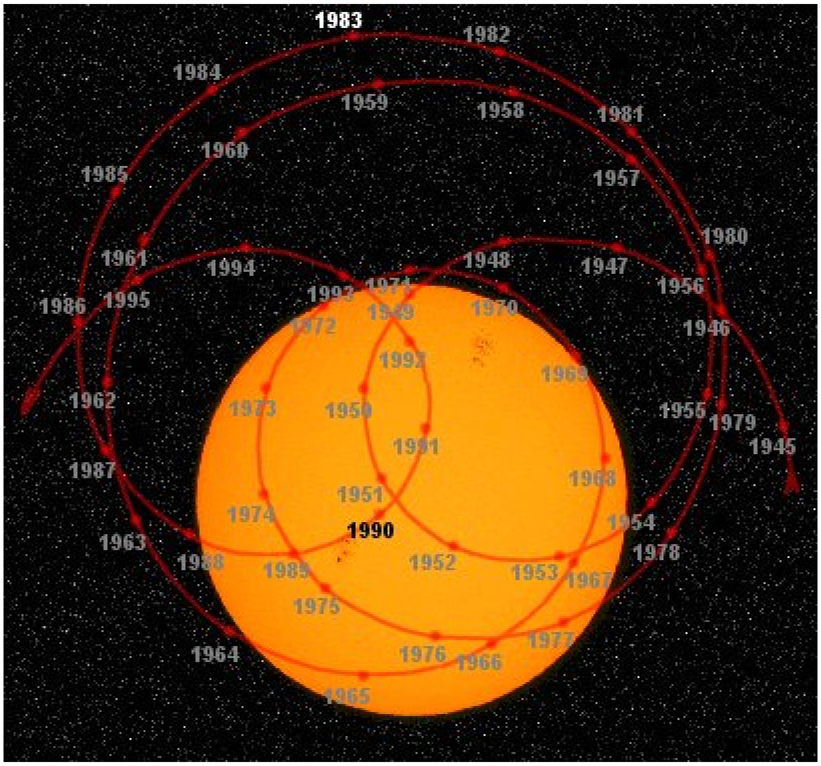

Figure 7: The solar system's center of mass: 1945 – 1995

The figure on the left shows the location of the solar system's center of mass for each year between 1945 and 1995. As you can see, over a fifty-year period, the complex motion of the heavy outer planets, especially Jupiter, profoundly affects the location of the solar system's center of mass. In 1983, for example, the center of mass was located a considerable distance from the center of the sun. That's because in that year, all of the outer planets – Jupiter, Saturn, Uranus and Neptune – were on the same side of the sun, putting almost all of the solar system's planetary weight on one side of the sun, and thus skewing the center of mass away from the sun. But in 1990, the center of mass of the solar system almost coincided with the center of the sun. That's because in that year, Jupiter, which is heavier than all the other planets combined, was on the opposite side of the sun from Saturn, Uranus and Neptune. Thus, these large planets tended to balance each other out, and leave the center of mass near the center of the sun.

The point of all this is to illustrate the fact that the center of mass of a moving system will always be moving, too. So, if the earth ever *were* at the center of mass of the universe, even a geocentric universe, it wouldn't be there for long. Also, recall that in order to compensate for the mass of the nearby sun and skew the center of mass out to the location of the earth, it was necessary to assume that the "shell" of stars was slightly heavier in the direction opposite that of the sun. But the sun is constantly moving relative to the stars, completing a full circuit of the sky over the course of a year. So even if the stars *were* heavier in a given direction, the sun would only be located opposite that direction at one time during the year. Six months later, the sun would be located in the *same* direction from the earth as the heavier side of the shell of stars, and that would skew the center of mass back toward the sun.

An even more devastating error the geocentrists make is that they assume that the center of mass of a celestial system is also going to be the point at which the gravitational forces from the various masses in the system all cancel out, so that if a planet were located at such a point it would sit there calmly, like a boat in the eye of a hurricane. Indeed, their whole argument depends upon this assumption.

But they are mistaken.

This is easily seen by referring to the figure below, which again shows the center of mass between the sun and Jupiter. The figure also shows the point at which the gravitational forces from the sun and Jupiter cancel each other out. There is a name for this point: it's called Lagrange point 1, or L1. It's the point between two celestial bodies at which the gravitational forces cancel out, and at which an object of negligible mass could theoretically remain stationary for a long period of time without needing any propulsion.3

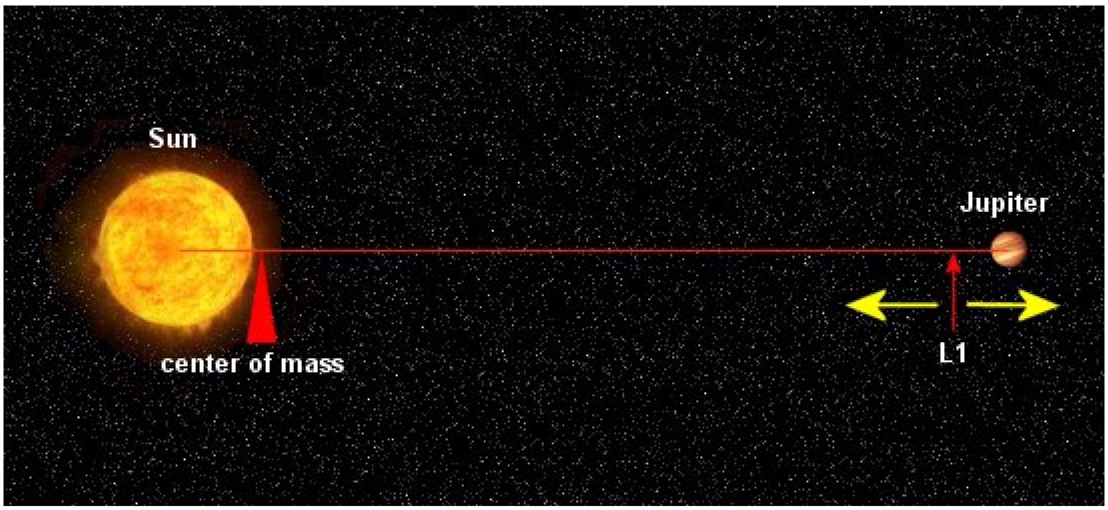

Figure 8: Where gravitational forces balance

As you can see, the center of mass is nowhere near the point of gravitational equilibrium (L1). In fact, these are two completely different concepts. The center of mass is the point in space that both the sun and Jupiter orbit, but it is *not* a point of gravitational equilibrium. Far from it. In fact, that point is so close to the sun that if there were a planet the size of the earth located there, the gravitational pull from the sun would be over a *billion* times stronger than the gravitational pull from Jupiter. That planet wouldn't just sit there, it would plunge into the sun. Rapidly.

Why is this so? It's because gravitational force is directly proportional to mass. In other words, all other things being equal, a massive body, like the sun, is going to exert a far greater gravitational attraction than a lesser mass, like Jupiter. Right away, that tells us that the point where the sun's gravitational pull equals that of Jupiter is going to be much closer to Jupiter than to the sun. In fact, the point of equilibrium is only about 32 million miles from Jupiter. The center of mass, on the other hand, is about 483 million miles from Jupiter.

This fact completely undermines the geocentrist argument, because even if it were possible for the earth to be permanently at the center of mass of the universe, that point is *not* a point of gravitational equilibrium. It *can't* be. The nearby sun is so massive (it accounts for 99.86% of the mass of the solar system) that it exerts a huge gravitational pull on the earth. The only way the earth could remain stationary is if there were some other object out there in space massive enough to counteract that pull, but there's simply nothing in the whole universe that can exert enough force to rival the gravitational pull from the sun.

R. Sungenis: if so, then why does Mr. Hoge believe that the sun orbits the center of the Milky Way galaxy? Evidently, there is a force from the center of his galaxy great enough to pull in the sun unless it moved at great speed to escape that pull. Now, let's multiply the power of the Milky Way core against the sun by 100 billion galaxies (which is the estimate for the number of galaxies in the universe). That's a very formidable force, no? Yes, indeed. It's the same reason that Misner, Thorne and Wheeler, three of the most famous physicists in the world today, said in their 1973 book *Gravitation* that "mass there [in the stars] governs inertia here [on earth]" (Misner, Charles W., Kip S. Thorne and John A. Wheeler, *Gravitation*, 1973, pp. 543, 546-47, 549). It's the same reason that Mach, Assis, Babour, Bertotti, and even Einstein, and many more world class physicists have said the same, namely, that there is no difference between a rotating earth in a fixed universe as opposed to a rotating universe around a fixed earth. Why? Because they have shown that the trillions of stars in the universe create the same centrifugal, Coriolis and Euler forces in either system. Evidently, all these physicists believe that the stars have tremendous force here on earth and elsewhere. Assis said it best when he wrote:

> …we have seen, Leibniz and Mach emphasized that the Ptolemaic geocentric system and the Copernican heliocentric system are equally valid and correct….the Copernican world view, which is usually seen as being proved to be true by Galileo and Newton….the gravitational attraction between the sun and the planets, the earth and other planets do not fall into the sun because they have an acceleration relative to the fixed stars. The distant matter in the universe exerts a force, $-m_g a_{mf}$, on accelerated planets, keeping them in their annual orbits.
>
> In the Ptolemaic system, the earth is considered to be at rest and without rotation in the center of the universe, while the sun, other planets and fixed stars rotate around the earth. In relational mechanics this rotation of distant matter yields the force (8.17) [$F_{Im} = -\Phi m_g [a_{mS} + \omega_{US} \times (\omega_{US} \times r_{mS}) + 2v_{mS} \times \omega_{US} + r_{mS} \times d\omega_{US}/dt]$, cited on p. 176] such that the equation of motion takes the form of equation (8.47) [$\sum_{j=1}^{N} Fjm - \Phi m_g [a_{mS} + \omega_{US} \times (\omega_{US} \times r_{mS}) + 2v_{mS} \times \omega_{US} + r_{mS} \times d\omega_{US}/dt] = 0$, cited on p. 185]. Now the gravitational attraction of the sun is balanced by a real gravitational centrifugal force due to the annual rotation of distant masses around the earth (with a component having a period of one year). In this way the earth can remain at rest and at an essentially constant distance from the sun. The diurnal rotation of distant masses around the earth (with a period of one day) yields a real gravitational centrifugal force flattening the earth at the poles. Foucault's pendulum is explained by a real Coriolis force acting on moving masses over the earth's surface in the form $-2m_g v_{me} \times \omega_{Ue}$, where v_{me} is the velocity of the test body relative to the earth and ω_{Ue} is the angular rotation of the distant masses around the earth. The effect of this force will be to keep the plane of oscillation of the pendulum rotating together with the fixed stars. (Andre K. T. Assis, *Relational Mechanics*, pp. 190-191).

Interestingly enough, Misner, Thorne, and Wheeler's inertia is relevant to the universe's center of mass, since inertia is one aspect that determines the center of mass. Inertia is also one of the forces that keeps the planets revolving around the sun. Assis merely adds centrifugal and Coriolis forces to complete the picture.

Mr. Hoge: It's not just that the sun is so massive – there are, after all, many objects in the universe more massive than the sun – it's that the sun is both massive and *close*. Distance is crucial because gravitational attraction is inversely proportional to the square of the distance between two objects. That's just a fancy way of saying that as you move away from a mass, its gravitational attraction decreases exponentially. Therefore, the amount of mass it would take to counteract the gravitational pull from the sun increases exponentially as you move away from the earth. By the time you get out to the edge of the solar system, it would take over 1,500 suns to do it! By the time you get to the nearest star, over four light years away, it would take more than 17 *billion* suns to do it. Clearly, then, there will always be a strong net pull on the earth in the direction of the sun. Therefore, the earth must either orbit the sun, or fall into it.

R. Sungenis: I have checked Mr. Hoge's calculations and he is correct that 17 billion suns would be needed four light years away to have a gravitational equilibrium with the sun. But let's say we have 100 billion times 100 billion stars, or 10^{22} stars in the whole universe (which is the closest approximation for modern science's estimate for the number of stars). That's 1 sextillion stars, 12 orders higher than 17 billion, and all of them taken together (according to Misner, Thorne and Wheeler) are "governing inertia" on Earth. All of them, according to Assis are counteracting the sun's pull against the planets so that the planets do not fall into the sun. So how can Mr. Hoge tell us that these stars are so far away that they don't have a direct effect on what occurs here in our system? Obviously he has overplayed his hand. Indeed, if Dr. Assis says that the stars keep the planets in their orbit, is it any great leap for me to say that those 1 sextillion stars can have a center of mass resting at the Earth? I dare say not, especially when we find that Misner, Thorne and Wheeler are working from a universe they believe is 6.75 billion light years in radius (due to the Big Bang and expanding universe theory they hold). Incidentally, there are other physicists who say that the universe is much smaller. One pair of physicists from MIT say the universe, if we eliminate the need for an expanding universe, is only 7.5 light years in radius (Parry Moon and Domina Spencer). In fact, since as I noted earlier, modern Big Bang cosmology claims that, in line with Newton's force laws the universe must be filled with 95% Dark Matter, yet since it is a fact that they have not found any Dark Matter, then we can easily interpret this evidence as follows: <u>the size of the universe has been estimated to be 95% bigger than it really is</u>.

In fact, in using Newton's gravitational equation ($F = Gm_1m_2/r^2$), if we estimate that each one of the 10^{22} stars in the universe have the same mass as the sun (2×10^{30}kg), and if we use a radius less 95% of the Big Bang universe to make up for the missing Dark Matter (5% of 13.5 billion light years = 6.75×10^8 light years), the gravitational force of the 10^{22} stars turns out to be 21 orders of magnitude greater than we need to counterbalance the sun! We actually have to add distance to r^2 in order to bring balance to the problem. For 10^{22} stars, r^2 for the universe needs to be at least 10^{38}, which makes $r = 10^{19}$ miles, yielding a light year radius for the universe of 10^7 or 10,000,000 light years. As we can see, there is plenty of star matter to have a great effect on our sun-earth system.

But whether we have a big universe or small universe, the basis for Mr. Hoge's objection is nullified by the findings of modern science. One sextillion stars <u>do</u> have a direct effect on how we experience gravity, inertia and the center of mass. If Mr. Hoge sees otherwise, he needs to argue with the top physicists of the world.

Mr. Hoge: The bottom line is that if the geocentrists are right about the structure of the universe, it would be possible for the center of mass to be located as far away from the sun as the earth is. And yes, everything would orbit that point. But it would be impossible for a planet, or any other object, to remain motionless at that point, for two reasons. First, the center of mass itself is constantly shifting as the various masses in the universe rearrange themselves, and second, a point in space that close to the sun would *not* be a point of gravitational equilibrium. There would be an overwhelming gravitational pull from the sun. A planet at that location would either have to move fast enough to orbit the sun (as the earth, in fact, does), or it would plunge into the sun and be destroyed. In no case could it simply sit there motionless.

R. Sungenis: Mr. Hoge cannot argue that it would be impossible for the celestial bodies to be arranged in such a way so that the center of mass for the universe is always at the same place. Mr. Hoge can posit that the center of mass near the sun shifts in his heliocentric system, but that is because he has limited the system to the sun, the planets and the earth. In other words, Mr. Hoge's shifting center of mass near the sun is what the math of Newton's force laws would require if we only had the situation of nine planets revolving around a sun (something he has not yet proven).

But, as he himself admitted above, "it would be possible for the center of mass to be located as far away from the sun as the earth is. And yes, everything would orbit that point," he also needs to admit that such a situation would be governed by the force of the 10^{22} stars in the universe. Since he has already admitted that the universe can be arranged in such a way that the Earth is their center of mass, then he must also admit that the relative movement of those stars could be arranged in such a way that no perturbations would exist to move the Earth from the center or center of mass. Mr. Hoge cannot have his cake and eat it, too. If he admits the Earth can be the center of mass of the universe, he must also admit that the universe can be so arranged (by God) that the Earth does not move from its appointed place. That is simple physics.

Secondly, I have for the sake of argument, limited the discussion to Newton's gravitation laws on how much effect the stars would have on our sun-earth system. I have done this in order to accommodate Mr. Hoge's desire to frame his objection strictly within the Newtonian system. But he himself would admit that modern science cannot get Newton's laws to work outside the solar system. As soon as we get into the territory of galaxies, then Newton's laws break down, and break down rather catastrophically. Since modern science says it is missing 95% of the matter in the universe to make its Big Bang/expanding universe work properly under Newton's laws, that means one of three things: a) Newton's laws are 95% inaccurate in outer space; b) the universe is 95% smaller than what the Big Bang holds; or c) there is matter enough in the universe to make Newton's laws work but which modern science has not found because they don't know what to look for.

Geocentrism, as I stated earlier, has a way to answer these problems. First, it does not need a big and expanding universe in order to function properly, and thus, it doesn't need all the matter that the Big Bang universe needs and can't find. On the one hand, we can postulate that the Earth can serve as the center of mass for the universe since we can distribute 10^{22} stars at a maximum radial distance of 10 million light years, and we can further postulate that the center of mass would not move if the 10^{22} stars are placed in the proper positions.

But we can also have a larger system on the size of the Big Bang universe because we have the necessary mass to make it work. It is called ether. Ether is an infinitesimal supergranular dense substance that pervades the whole universe. Maxwell's electromagnetic equations work off of the presence of ether and modern science has already agreed (as it departs from General Relativity to Quantum Mechanics) that space is not a vacuum but is filled with Planck particles. In fact, Einstein himself had to go back to the ether concept and it showed up in his lambda (λ) fudge factor for the expansion of the universe so that the universe would not collapse in on itself.

In any case, ether is what gives the universe its most mass, perhaps 95% to 99% of its mass (and thus answers the question as to where the Dark Matter is). Ether permeates every known substance, from mass to "empty" space. (In fact, I use this principle in *Galileo Was Wrong: The Church Was Right*, Chapter 7, (which basic principle I got from St. Hildegard, which is in chapter 16 of volume 2), to show one solution to the physical cause of gravity and why Newton's gravitation laws work.

We also believe there may be two forms of ether, from an electron-positron lattice throughout space (which I call "electropons" in GWW) with a density 6×10^{30} cm^3 (which explains why a positron is released in free space from an electron whenever a 1.022 Mev charge is administered in space; which is opposite the idea of Einstein that matter is "created" in space by the 1.022 Mev charge); to a much more dense and supergranular ether composed of Planck particles (or what I call plancktons in GWW), which are 10^{-33} cm in diameter (the idea of a double ether which I obtained from physicist Allen Rothwarf in "Cosmological Implications of the Electron-Positron Ether," *Physics Essays*, 11, 1998; and the electron-positron ether from Menahem Simhony in *An Invitation to the Natural Physics of Matter, Space, Radiation*, 1994. Both Simhony and Rothwarf have the density for electropons at 10^{30} cm^3).

I say all that to say this: when we are computing the mass needed to make the Earth the center of mass for the universe, it is not merely the 10^{22} stars that have an effect, but the ether that permeates the whole universe. Since the ether is much, much denser than the celestial bodies it will have the greatest effect on how the center of mass is determined <u>and</u> in the fact that the center of mass will not move from its original position (which is Mr. Hoge's chief concern). In fact, the ether will have at least 99% of the factor that determines the center of mass.

Moreover, since the ether remains at equilibrium with itself (i.e., no "shifting" of mass) and rotates like clockwork with the universe, it will be stable. As such, any object can be placed at the universal ether's center of mass and actually become and remain its center of mass. That center of mass will remain motionless and stable due to the immense mass and stability of the ether surrounding it.

The only other physical motion that needs to be accounted for is why the rotating ether does not cause the Earth, its center of mass, to rotate. But that issue has already been solved by modern science and we write about it in chapter 9. Misner, Thorne and Wheeler show that the center of mass would not rotate in a viscous situation (which ether is):

> Consider a rotating, solid sphere immersed in a viscous fluid. As it rotates, the sphere will drag the fluid along with it. At various points in the fluid, set down little rods, and watch how the fluid rotates them as it flows past. Near the poles the fluid will clearly rotate the rods in the same direction as the star [*i.e.*, sphere] rotates. But near the equator, because the fluid is dragged more rapidly at small radii than at large, the end of a rod closest to the sphere is dragged by the fluid more rapidly than the far end of the rod. Consequently, the rod rotates in the direction opposite to the rotation of the sphere. (Misner, Thorne and Wheeler, *Gravitation*, p. 1120. When the authors say "the fluid is dragged more rapidly at small radii than at large," they are referring to a rod positioned perpendicular to the tangent of the

sphere, wherein the part of the rod closest to the sphere's tangent is the "small radii" while that farther away is the large radii.)

Likewise, when we calculate the miniscule opposing forces of the sidereal year as opposed to the solar year, it will not cause the barycenter (the earth) to move, but it could cause a slight but persistent precession in the celestial revolutions, and this would answer to the cyclical precession (or gyroscopic) patterns we observe between earth and the rest of the universe (e.g., 19 years, 26000 years), and might also answer why the plane of the sun's orbit shifts 46 degrees every sixth months.

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December 27, 2010