

DEBATE ON GEOCENTRISM
PARTICIPANTS: DAVID PALM VERSUS ROBERT SUNGENIS
JULY 2018

DP: Let me say at the outset that I'd be happy to discuss the matter of the ether and the Michelson-Morley experiment further on the Non Sequitur Show. This has been a central argument in the controversy. As I'll lay out below, I don't think this works out well for the geocentric viewpoint and I'd be willing to unpack that in another discussion.

RS: After reviewing your comments below, I think your whole case stands or falls on how you have interpreted the 1887 Michelson-Morley experiment, and the related experiments, such as the 1913 Sagnac experiment, the 1925 Michelson-Gale experiment, and the 2000s sapphire resonator experiments. Suffice it to say, I am now convinced beyond a doubt that you misinterpret them.

DP: On the more central topic of whether geocentrism is a matter of faith – and now that we've had a live discussion on scientific topics – I'll renew my offer to discuss that in detail in a formal, moderated, written discussion as I've laid out [here](#). I think the written venue maximizes the ability to seek truth, without the emotions or the potential “oops” factor of responding on the fly. Such an important topic deserves the most sober, truth-seeking discussion possible, imo. I've advanced the resolution “The Catholic Church does not propose that the Earth is the immobile center of the universe to the faithful as a matter of divine revelation” and I would take the affirmative.

RS: I would say the science issues are hardly exhausted, but since I have found through responding to this paper that it actually is a good way to debate the issue, I would be more than willing to accept your resolution and start a paper debate on the doctrinal status of geocentrism. Since you want the “affirmative” position, I'll let you start. Layout your major points and its defense and send them to me.

In the meantime, I think we should both make this present debate known to the public in its present form and length, and either of us can add to it in the future as long as the other gets a chance to respond. However, our challenge to an oral debate still holds and I await your acceptance to that challenge. I think the oral debate will be especially fruitful after we've had the chance to flesh out our respective sides on paper.

DP: Now, to your questions, let me take some of the quick ones first. **Gregory Snelgar:** On the quote from Gregory Snelgar, it does not appear to me that Snelgar is a physicist. His Amazon profile says he “is a comedian and model appearing on TV in Japan” and a “writer”. His book on particle physics for kids got dinged in its one review

on Amazon because he threw the F-bomb into a childrens' book. LOL! Anybody can call himself anything he likes on Quora. But it doesn't appear Snelgar has demonstrated competence in the field.

RS: Well, I'll concede that Snelgar is not the best moral icon I could have used, but the fact that a man can write a book on particle physics and answer physics questions on the Quora quite cogently, it is obvious that he knows the physics. I think the burden of proof is on you in claiming he doesn't know the physics. After all, neither of us have degrees in physics yet we are debating nonetheless. Besides, if we were going to judge the man's physics credibility by his moral peccadilloes, I dare say that both Newton and Einstein would fare far worse than Snelgar. Hence the point Snelgar makes still stands. As a heliocentrist who refers to geocentrists as "egocentrists," we know the man is not being partial to geocentrists in his assessment of the two systems (geocentrism or heliocentrism), so I think Snelgar's comment remains an important third-party objective conclusion that the geocentric is the simpler of the two models.

For those who did not see his comments, allow me to reiterate them here:

Last night I also quoted from physicist Gregory Snelgar and his remark about the simplicity of the geocentric system, even though he is a heliocentrist.

He mentions the neo-Tychonic model, which is the model that any modern geocentrist uses, including me. The link is: <https://www.quora.com/profile/Gregory-Snelgar>. Here is what he wrote:

Geocentrism

Is it possible to construct a modern geocentric model?

Gregory Snelgar, Physicist

Answered Aug 31, 2016

A geocentric model would also be an ego-centric model. It would require you to believe that the whole universe revolves around you.

But mathematically it would actually be simpler and more elegant. Perhaps you are thinking of the Ptolemaic system which required complex and inelegant "deferents" and "epicycles".

If we take the neo-Tychonic model, it is actually simpler and more elegant than the current standard model. The other planets orbit the Sun as per modern observations, but the Sun orbits the center of mass of the universe, which is the Earth.

This is observationally identical to the standard model but philosophically unwelcome.

Mathematically it is more elegant because it does away with cosmic inflation, the Lorentz contraction, etc. which were designed with the specific goal of avoiding an egocentric model.

DP: On the geocentric model being “simpler”: Again, I have to disagree. The geocentrist doesn't have just “one moving part” in his model. He still has to account for all the other motions and phenomena in the universe via the normal laws of gravity, so moons orbit planets and planets orbit stars and the massive ones all spin on their axes and so on.

RS: Yes, but the geocentric system is still the simpler. Your system requires the Earth to rotate on its axis and to revolve around the sun. So right from the get-go you have a very fragile system, since a small spinning and revolving Earth is going to run into all kinds of problems with opposing forces that seek to slow it down, as opposed to a huge universe in the geocentric system that only has to spiral, but has enough momentum to do so without being appreciably curtailed by opposing forces.

Your sun then has to perform a similar task to your Earth, by revolving around the Milky Way and seeking to maintain its velocity amidst all the opposing forces it will encounter in that trip. The Milky Way itself is said to be revolving around another cluster of galaxies and/or expanding outward and thus it must be able to fight its way through all the opposing forces it meets. (And, we must add that, if the universe is expanding, then why aren't the galaxies expanding internally but always stay the same size?)

In the geocentric universe, we don't have such problems. The sun, the Milky Way and all the other galaxies are relatively stationary with respect to each other, as all of them are confined and carried by a rotating but non-expanding universe. The only thing we have to account for outside the normal gravitational fields of the stars on their planets and planets on their moons, is a sun that revolves around the Earth a little slower than the stars (the reason being that the planets put a gravity drag on the sun).

Additionally, your universe has to start from a Big Bang and somehow evolve into the complexity we see today against the second law of thermodynamics and with all the developmental problems of trying to get organization out of an explosion, which then forces ad hoc stages (e.g., inflation, dark energy, dark matter, fluctuating Hubble and Lambda constants, etc.). You also have a universe that has to expand rather rapidly to keep up with 1A supernova requirements, and by the time you're done, you have a universe expansion that exceeds the speed of light by at least four factors in violation of Einstein's SRT (the same speed of light, ironically, that required “inflation” at the beginning). The expansion also causes problems because you need to explain where the energy comes from to continue the expansion (so they invent ad hoc things like “dark

energy”); and you also need to explain where all the gravity comes from for this expanding universe since you only have 4% of the baryonic matter that is needed for the gravity claimed.

In the geocentric system, we don't have a Big Bang and its developmental problems, since the only way a geocentric system could come to be is if the whole thing were created at once by divine fiat, since the parts, following Behe, have an irreducible operational complexity. And we obviously don't need an expansion of the universe since we don't need to form galaxies or wait for the heat to go down over billions of years; and we don't need to have a Hubble constant (that your system keeps changing), or a lambda factor (that your system keeps changing); and we don't need to discuss whether we have a curved or flat universe (that your system keeps changing). Our system is complete and ready to use in six days, and all it needs to do is rotate once a day around a fixed Earth to keep it going, which is rather easy for such a massive universe with a lot of momentum. All it needs is one push from its Creator and it will rotate indefinitely.

And just to finish the thought, as you know, a rotating universe around a fixed Earth is allowed by both Newtonian and Einsteinian mechanics, so the geocentric system obeys any “laws” of physics now in vogue.

DP: To slightly modify the verbiage you deployed against the flat Earthers, you're “telling us that society as a whole has been deceived into thinking that the Earth is [motionless], despite the fact that every other celestial body we see in the universe, from our sun, our moon, the planets or the stars, [orbit more massive objects and spin on their axes].”

RS: Yes, the geocentric system also expects that “every other celestial body we see in the universe, from our sun, our moon, the planets or the stars, [orbit more massive objects and spin on their axes].” But those who know the physics know that all of it can take place within a universe that rotates around its center of mass. Your job is to show why that system can't work, especially when both Newton and Einstein have admitted that it does work.

DP: But now we look to explain observational evidence for things like the equatorial bulge, stellar parallax, aberration of starlight, precession, nutation, etc. As I tried to point out in the discussion, these things are *predicted* by the standard view but some, like parallax and aberration, would not be predicted by the geocentric model at all.

RS: So you think that just because a model can predict something that means the model is necessarily right or that another model can't produce the same thing? If you do, I think you should check your premises, since a faulty premise will always lead to a false

conclusion. If I predict that a chicken will cross the road, you and I both know that there are 101 reasons why he might do so.

DP: And as we wrote in “[Geocentrism and Stellar Aberration: Illuminating the Earth’s Motion](#)” phenomena like aberration and parallax just happen to display the exact amplitude and period that we would *expect* if the Earth was gravitationally bound to the Sun and orbiting according to normal orbital mechanics (correct distance from Sun and orbital period.)

RS: No one on my side of the fence ever argued that heliocentrism couldn’t explain parallax or aberration. We simply stated that, according to the general principle of relativity, the same parallax and aberration would necessarily be explainable in the geocentric system. It is not an option. It is explainable in the geocentric system, otherwise, math is no longer math.

DP: These require special pleading in order to explain them any other way.

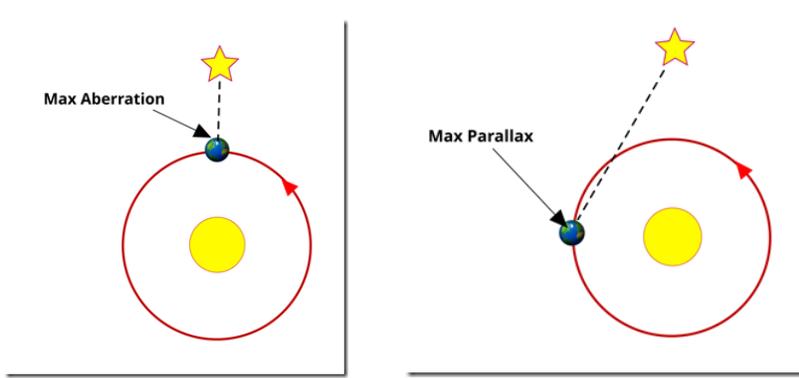
RS: The only “special pleading” here is your pleading to the audience to discount the geocentric alternative and accept only the heliocentric.

DP: They also require two separate additional motions of the universe because, again as I mentioned in the discussion, the same motion that could create the appearance of parallax will not do the same for aberration and vice versa.

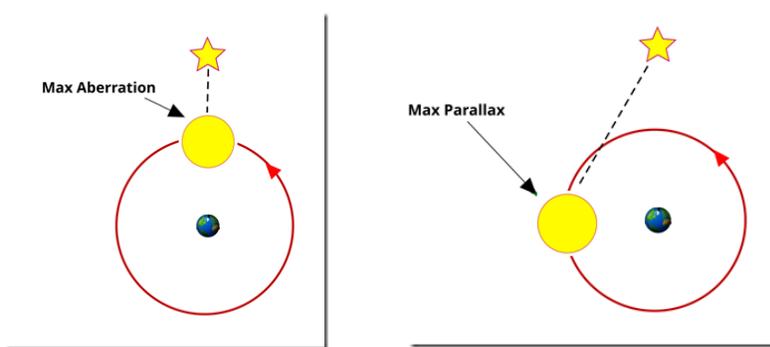
RS: Parallax and aberration need two different motions in your system, but not in ours. This difference, once again, shows the simplicity of our system over yours. Our Neo-Tychonic animations (the stars are centered on the sun, and the sun and stars go around the Earth) show that the same movement of the universe that causes parallax will cause aberration.

In 1727, Bradley stumbled onto aberration, although he had been looking for parallax. In looking for parallax, the observed displacement was greatest for stars in the direction perpendicular to the presumed orbital plane of the Earth (or, the orbital plane of the sun/stars in the geocentric system), and most puzzling was that the displacement was exactly three months (i.e., 90 degrees) out of phase with the effect that would result from parallax. So Bradley didn’t find parallax; he found aberration. This is because the maximum effect of parallax takes place at 90 degrees off the orbit from where the maximum effect of aberration does. Maximum parallax is at the farthest limits right and left in the orbit. But Bradley found the maximum effect was in the middle of the orbit. Our animations show this 90 degree difference, and also why only one motion, a rotating universe, can suffice for both parallax and aberration. I am going to put these

animations up on our www.jttcotu.com (www.journeytothecenteroftheuniverse.com) to make these available for everyone. For now, I can only offer snapshots.

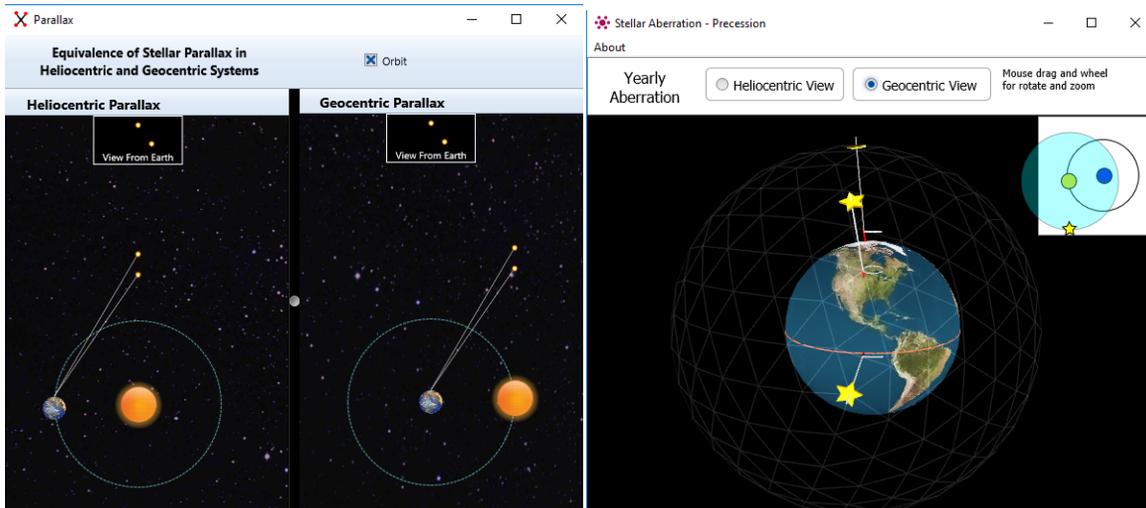


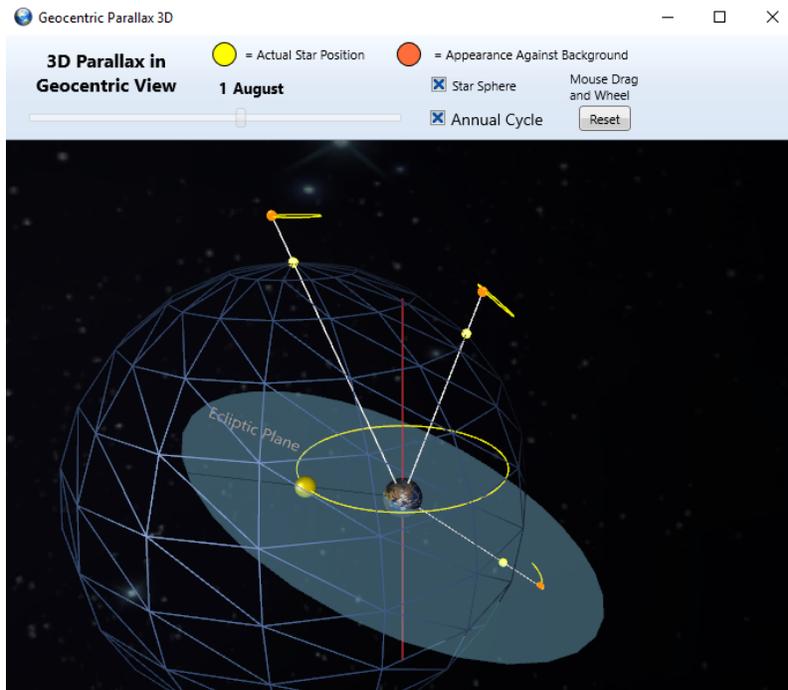
Heliocentric System



Geocentric System

Below are the animations we have that show both parallax and aberration in each system





DP: All of those observed phenomena I outlined, and more, are explained simply by seeing that the Earth orbits its star and rotates on its axis just like those do. Full stop, that's it, nothing else is required.

RS: So again, you need two motions (a revolution and a rotation of the Earth) whereas we need only one (a spiraling rotation of the universe). But there is a problem in your heliocentric system. Heliocentrists have used at least three different solutions in an attempt to solve the aberration problem: the Fresnel drag, the Lorentz contraction, and Special Relativity. I suggest you look up the difficulties they have.

Things were further complicated for the heliocentric system when Airy's failure (1871) precluded the solution that aberration could be due to Earth movement, since with his two telescopes he saw the starlight came to Earth as if the earth was motionless and the star was directly overhead of the Earth (i.e., the star light had zero incidence), which is why Airy's failure is one of the best evidences for geocentrism ever produced. As I note in GWW:

Aware of the acute dilemma for heliocentrism that Airy's experiment presents, an example of how modern science seeks to rationalize its results is noted in the explanation of S. Tolansky on the art of telescope viewing: "If the Fresnel drag coefficient be introduced into the calculation of the aberration, there emerges the fact that the aberration is the same with or without water in the telescope. Thus, conversely, Airy's negative result confirms the validity of the Fresnel coefficient" (*An Introduction*

to *Interferometry*, 1973, p. 98, cited in *De Labore Solis*, p. 35). What Tolansky didn't tell his students is that if the Fresnel coefficient is NOT used for both telescopes, they would both still produce the same aberration, and thus the Fresnel drag becomes superfluous, except for those trying to save the appearances for heliocentrism. As van der Kamp notes, "...the drag coefficient cannot be dragged into court to vindicate Copernicus" (*op. cit.*, p. 36).

Another objection comes from Wolfgang Pauli. With his typical pungency, Pauli wrote in 1958: "The Airy experiment, as seen from the rest system of the observer (Earth), therefore only demonstrates the (relativistically) trivial fact that for a zero angle of incidence (normal incidence) the angle of refraction is zero, too" (Wolfgang Pauli, *Theory of Relativity*, translated by G. Field, 1958, p. 114). Apparently, Einstein did not share the same casualness about Airy that Pauli did. Pauli seems to have both forgotten that neither the "observer" nor the "Earth" are "at rest" in the Copernican system, and that a "zero" value to both incidence and refraction is precisely the reason Airy's experiment is so important, since, given the same incidence of starlight in both telescopes, only the Earth's velocity would have made the starlight hit the side of the telescope.

Moreover, it would be rather difficult for Relativity to explain stellar aberration on the basis of the limited speed of light, since without ether, Relativity must understand light as a scalar phenomenon (*i.e.*, it has a speed but no definite direction, and thus the speed is everywhere the same), not a vector (*i.e.*, a definite speed in a definite direction). As such, Relativity will see the star rotate rather than exhibit an aberration. Other attempts to explain Airy's failure use the Fitzgerald contraction hypothesis, that is, the telescope shrank in the direction it was moving, or that the telescope expanded in the direction perpendicular to its movement. It may be no coincidence that the Fitzgerald contraction predicts the same result for Airy's experiment as the Fresnel drag. Thus, as Bouw notes: "Physically speaking, if they are real, both effects must be contributing so that in actuality we must either conclude that Fresnel drag and the Fitzgerald contraction are one and the same thing or else that one effect or the other, but not both, is in operation. If the Fitzgerald contraction is removed then the only conclusion left is that the earth is standing still; otherwise, if Fresnel drag is removed, the question remains as to why Fresnel drag is observed in the laboratory but not in this analogous case. The simplest solution is that the earth is at rest, immobile, in absolute space" (*Geocentricity*, p. 244).

DP: But for the geocentrist to explain these *local phenomena* he has to posit *additional motions* of the entire universe around the Sun. The whole universe has to be centered on the Sun, ironically enough for an allegedly geocentric system, and then wobble and rock and roll in just the ways needed to make it *look like* the Earth is orbiting the Sun and rotating on its axis according to normal orbital mechanics, without it actually doing so.

RS: I'm not quite understanding your complaint. You have attempted to explain parallax and aberration by the Earth revolving around the sun and rotating on its axis, but I explain them with one motion—a universe geometrically centered on the sun and rotating in spiral motion around the Earth—yet somehow you see difficulty in mine but

not yours. You have two required motions but I have one, but somehow you think mine is more complex?

Or perhaps you are still having difficulty in accepting that the universe can rotate around the Earth. But the motion of the universe around a fixed Earth is as old as the Hebrews (Moses, David, Solomon) and the Greeks (Aristotle and Plato); advanced by Ptolemy; geometrically satisfied by Brahe; and dynamically satisfied by Mach and Newton's alternative view; and confirmed by Einstein, and many more physicists since none of them can remain a rationale scientist and deny its viability (e.g., Hoyle, Russell, Cohen, Sciama, Hawking). It seems to me that you've learned over the years that you can't discount geocentrism geometrically or dynamically so you now opt for the Rube Goldberg defense to claim that geocentrism is more is "complicated."

DP: Also, you claimed during the discussion that we would naturally expect such motions from a rotating object (the universe). I don't think this accords well with the enormous mass we're talking about, the mass of the entire universe. A ~26,000 year simple precession does not present as much problem in that regard, but geocentrists should explain why and how the entire massive universe would be "expected" to display various nutations that occur "on much shorter time scales (days to years)" ([link](#)). On the other hand it is perfectly reasonable that a relatively less massive Earth rotating on its axis would display both precession and various nutations and this is further supported by the fact that we observe just such phenomena on other planets.

RS: David, your job is to prove that a spiraling universe cannot cause the various precessions and nutations we see, not just assume it must be so simply because it sounds complicated to you. Contrary to what you are claiming, it has been shown over and over again by qualified physicists that every single motion you attribute to the Earth in a fixed Universe can be demonstrated by a Universe rotating around a fixed Earth. For example, in 1918, Hans Thirring was the first to show how this would work. He showed, by pure mathematics, how a rotating universe would affect pendulums on Earth, satellites above the Earth, winds on Earth, and even how its own nutation and precession would affect what we see on Earth. As Max Born notes:

...Thus we may return to Ptolemy's point of view of a 'motionless Earth.' This would mean that we use a system of reference rigidly fixed to the Earth in which all stars are performing a rotational motion with the same angular velocity around the Earth's axis...one has to show that the transformed metric can be regarded as produced according to Einstein's field equations, by distant rotating masses. This has been done by Thirring. He calculated a field due to a rotating, hollow, thick-walled sphere and proved that inside the cavity it behaved as though there were centrifugal and other inertial forces usually attributed to absolute space. Thus from Einstein's point of view,

Ptolemy and Copernicus are equally right. What point of view is chosen is a matter of expediency.¹

Interestingly enough, Thirring discovered that pendulums, satellites and winds would behave very much like we see them behave, but not exactly. He discovered that the gravitational field inside the rotating universe was above zero. He discovered that these “above zero” forces are caused by the centrifugal and Coriolis forces, the very ones that are deemed “fictitious” in the Newtonian system and thus would measure zero. But since they were above zero in Thirring’s geocentric model, this meant they were real forces and not fictitious. It is these very forces that are understood as gravitational forces in the geocentric system. In fact, since the geocentric model includes the entire universe and doesn’t need to add in “fictitious” forces, it shows itself to be the more complete system, as opposed to the Newtonian which must confine itself to our solar system and consider the universe “absolute” (non-moving) and dynamically inert.

Thirring’s 1918 paper was followed by Christian Møller in 1952 who analyzed how the Milky Way and the solar system rotating around a fixed Earth would affect things on Earth. This was followed by Birkoff, who showed that the inertial forces are the same as gravity. Next, Brown used Newtonian gravity and arrived at a geocentric universe. This was followed by Nightengale and Rosser who showed how the universe can rotate much faster than light and not become unstable. And best of all was Barbour and Bertotti, all of which are listed in my book, GWW. They all found the same thing, that is, everything we see on Earth can be explained by a rotating universe around a fixed Earth, including all the precessions and nutations. Obviously, no scientist worth his salt is going to disagree with this finding since if they did he would have to admit that the laws of physics are different depending on where one is in the universe. If you complained to one of these scientists, or even Einstein, that such a reversal of what we have been taught (e.g. the Earth rotating and revolving) is merely a Rube Goldberg, they would point the finger right back at you. Not only is a rotating universe simpler and more stable than a rotating and revolving Earth, it answers a lot more questions that have plagued your model (e.g., can light go beyond c ?; can gravity go beyond c ? what is inertia and where does it come from? How do we get out from under having to use ‘fictitious’ forces to send up satellites?, etc.).

¹ Max Born, *Einstein’s Theory of Relativity*, 1962, 1965, pp. 344-345. Thirring’s model has been duplicated by Barbour & Bertotti (*Il Nuovo Cimento B*, 38:1, 1977) and Joseph Rosen (“Extended Mach’s Principle,” *American Journal of Physics*, Vol 49, No. 3, March 1981) using Hamiltonians; and by William G. V. Rosser (*An Introduction to the Theory of Relativity*, 1964) who expanded on Thirring’s paper and noted that the universe’s rotation can exceed c by many magnitudes; Christian Møller (*The Theory of Relativity*, 1952) who also extended Thirring’s paper using a ring universe rather than a shell; G. Burniston Brown (“A Theory of Action at a Distance,” *Proceedings of the Physical Society*, 1955) who discovered geocentrism based on Newtonian physics; Parry Moon and Domina Spencer (“Mach’s Principle,” *Philosophy of Science*, 1959) who arrive at geocentrism using Mach’s principle; J. David Nightingale (“Specific physical consequences of Mach’s principle,” 1976) who transposed the Einstein equation of Mach’s principle into Newtonian physics for a geocentric universe; and several others do the same.

The Newtonian system not only has a problem with ‘fictitious’ forces and making the universe inert, it also has a problem with how to integrate these fictitious forces with its gravity equation. For example, the gravity equation, $F = GMm/r^2$ is said to equal the centrifugal/centripetal equation $F = mv^2/r$, so that the forces balance and the planet can orbit the sun. But if we reduce the $F = GMm/r^2 = mv^2/r$ to its least common multiple, the small “m” cancels on both sides and we are left with $GM/r^2 = v^2/r$, which means that the mass of the planet has been excluded and only the sun’s mass is left to determine the orbit. But the original equation ($F = GMm/r^2$) requires that both bodies, the sun and the planet, be used to calculate the orbit. Apparently, there is a defect in Newtonian mechanics, but we have no such defect in the geocentric system.

DP: (And it’s not just motions of physical objects that have to added to the geocentric model. The CMB displays an annual Doppler shift when viewed from the Earth. This would be expected according to normal orbital mechanics, but would not be expected in a geocentric model and requires additional “motion” of the entire CMB to explain it. Dr. MacAndrew has a good presentation of this in “Here Comes the Sun”, pp. 10-11.). So no, I strongly disagree with the argument that your model is simpler. I stand by my characterization of it as an exercise in special pleading, that it is not reasonable to abandon a parsimonious explanation in favor of such ad hoc explanations and special pleading, and that it’s completely unnecessary since it isn’t a matter of divine faith.

RS: Glad you brought this up, because it’s one of the best demonstrations we have of a fixed Earth. What you don’t seem to be aware of is that the CMB anisotropy is only one annual Doppler shift we have measured for the Dipole. There are at least two others and neither of them provide the presumed speed of the solar system through the galaxy that your system has adopted, and one of them is four times higher than that presumed speed.² So that means you have a real problem, since there are multiple Doppler shifts hitting the Earth at different speeds, but in your heliocentric system they should be all one speed, namely, the speed of the Earth through the fixed radiation. The only way to get two, three or more speeds is if there are various sources for the dipole anisotropy that are moving against a fixed Earth.

DP: Eclipses and Length of Day: In my opinion the assertion over the years that the length of day has remained absolutely constant is untenable in the face of several threads of observational evidence. First, here are some articles on eclipses as evidence of length-of-day shift:“[Ancient eclipses show Earth’s rotation is slowing](#)”“[Historical eclipses and Earth’s rotation](#)”

² “Dipole anisotropy in flux density and source count distribution in radio NVSS data,” R. Kothari, A. Naskar, P. Tiwari, S Nadkarni-Ghosh and P. Jain, July 8, 2013, Dept. of Physics, Indian Institute of Technology, Kanpur, India, at arXiv:1307.1947v1.

[“Measurement of the Earth's rotation: 720 BC to AD 2015”](#) Although the Earth’s rotation is slowing very subtly, those changes accumulate such that over hundreds and thousands of years it shifts when and where eclipses occur compared to when they were predicted.

RS: If eclipses were found in different places such that it was caused by a slowing down of the relative rotation, we can easily attribute it to a slowing down of the daily rotation of the universe, the sun or the moon (especially since the moon’s orbit increases in radii by 4cm per year). The second law of thermodynamics allows for such a uniform slowing down over time. So, the eclipses prove nothing for you. Your system would still be more unstable, since the forces you listed in the articles are not uniform but somewhat erratic and appreciably unpredictable. As such, you never know what speed your spinning Earth is going to be from one day to the next.

DP: There are other lines of evidence for the length of day lengthening, including fossil data.

RS: That’s a new one. You’ll need to explain that one.

DP: You said, “if we added up all the inertial retardation forces that occur on the Earth daily, such as earthquakes, tsunamis, volcanoes, etc., these, over thousands of years, should have slowed the Earth’s rotation down much more than the mere micro-seconds we find in the VLBI, and the amount would also be a retardation, never an increase in the rotation speed (yet the VLBI shows both positive and negative micro-second deviations).” I think this needs to be determined empirically; it can’t be predicted. The slowing of Earth’s rotation is measured via several different technologies, including VLBI, ring lasers, and laser-ranging off the lunar reflectors. My understanding is that while the general trend is that the rotation is slowing down, due primarily to the Moon’s tidal drag, there are smaller fluctuations in the rotation rate due to changes in the Earth’s moment of inertia which are measured as both positive and negative shifts in the length of day. Which brings us to... **VLBI:** On VLBI, I think the difficulty remains for your view and Mr. Hatch gave in too easily. For starters, I think at least one statement in *Galileo Was Wrong* (GWW) reflects a misunderstanding of how VLBI works. You wrote: “Another problem for VLBI measurements is that they are performed using radio wavelengths. These are very long wavelengths compared to X-rays or gamma rays. Longer wavelengths create poor resolution. Hence, what may look like a phase shift in VLBI may, indeed, be only a false reading due to poor resolution (GWW1, p. 195.)” Longer wavelengths do yield poorer resolution, but one can gain greater resolution by making the telescope itself larger. In radio telescoping this is accomplished by making the individual radio telescopes themselves as large as possible, and in VLBI it is enhanced further by coordinating the readings from a number of widely dispersed radio

telescopes: “Radio waves have a large wavelength and hence have poor resolution. So, to improve the resolution of the radio telescopes, they are made as large as possible. To increase the collecting area, the radio telescopes are made in the form of arrays. In an array two or more telescopes are used and their signals are combined. The distance between two telescopes can be large. Some arrays have telescopes situated on opposite ends of the earth (called, Very Long Baseline Array (VLBA); in this case the resolution angle becomes very small ([link](#)).” You were correct, however, when you wrote that if scientists were “to allow the VLBI to absorb radiation from *at least three sources, if not more*. [and] If it is found that all the other sources are moving in the same precise way as the original source, *then there is evidence that the Earth is rotating*” (GWW1, p. 195; my emphasis). This is just what is done and what is observed. They do not look at one source, they look at many. The quote I deployed on the show was, “Usually the VLBI-data are acquired over a 24 hour period *on about 30 quasars in about 300 different directions*. . . . By observing *many sources distributed across the sky with multiple antennas distributed around the globe*, one can simultaneously solve for the source positions, antenna locations, and the orientation of the Earth in space” ([link](#); my emphasis). Another technical paper says that “So far [a total of] about *4500 sources* have been observed by geodetic VLBI” (“[VLBI Geodesy: Observations, Analysis and Results](#)”) These ultra-distant radio sources, spread across the sky are observed to “move” in precisely the same ways, at the same time. Again, some of the movements that are observed are tidal influence on Earth rotation, precession, nutation, etc. As I said in the discussion, VLBI is precise enough to detect and track terrestrial motion such as tectonic plate drift. This is well established and its results compare well to those gleaned from side-looking radar (SLR), a totally different, exclusively terrestrial technology ([link](#)). This bolsters the conclusion that what we are observing with VLBI is terrestrial motion, not motion of the celestial objects. Thus, to explain VLBI from a geocentric vantage we would need rational reasons to posit that thousands of ultra-distant celestial objects just happen to move in perfect sync, in ways that reflect terrestrial motion, like tides and tectonic plate drift, as well as motions that are most naturally attributed to the motion of the Earth, like polar wobble, which we observe on other planets. In my view the only reasonable and certainly the most parsimonious explanation for VLBI observations is that the Earth is moving. As you said in GWW: “If it is found that all the other sources are moving in the same precise way as the original source, *then there is evidence that the Earth is rotating*.”

RS: Well, I think Ron Hatch was correct and I was wrong in even allowing the possibility of a rotating Earth based on improved VLBI. The general principle of relativity wins on this one just as it wins on the eclipse data.

DP: On sapphire resonators measuring the invariance of the speed of light: On the sapphire resonators, you stated that researchers invoked the Lorentz contraction

to explain the results. It seems perhaps you're confusing this with the fact that the articles on the resonators say they are measuring "Lorentz invariance", which isn't the same thing (see e.g. ["Rotating Microwave Cryogenic Sapphire Oscillators for Tests of Lorentz Invariance"](#) and ["Improved test of Lorentz invariance in electrodynamics using rotating cryogenic sapphire oscillators"](#).)

RS: Yes, I should have phrased it differently, but this will be explained in later parts of my rebuttal.

DP: Lorentz did advance contraction as a possible explanation of MMX, but even at the time this was seen (by him too, I think) as an ad hoc, unsupported explanation.

RS: I beg to differ. Lorentz even tried to support it by his electron theory in his 1896 paper, i.e., that electrons could be squeezed. Einstein certainly didn't consider it ad hoc, since he fully adopted the Lorentz contraction in his Special Relativity theory. I suggest you read Einstein's 1905 paper and see how many times he refers to the Greek letter β , which stands for the Lorentz length contraction and the dilation of time, in order to explain various phenomena, including the Michelson-Morley experiment.

DP: I stand by my statement, though, that Einstein's second postulate alone is adequate to explain the null result of MM-style interferometers (including sapphire resonators) and a host of other observations.

RS: You can stand by it, but it isn't going to help you when all is said and done. Without Einstein's Lorentzian fudge factor, which was based entirely on Lorentz's contraction formula of $L = L \times \sqrt{1 - (v/c)^2}$, Einstein would have no explanation for MMX's null result.

DP: And the invariance of the speed of light has been tested to "insane levels of precision", to quote Dr. MacAndrew, thereby eliminating the need to postulate the existence of a luminiferous ether.

RS: The so-called "insane levels of precision" of light speed are all based on a grand flaw in how you interpret the results, and a flaw so big it verifies the geocentric theory and sets aside your own. The grand flaw is that the so-called "precision" is performed with MMX-type apparatus and ignores the MGX-type apparatus. As I told you in the email, all sapphire resonators are based on an MMX orientation (that is, the resonators are perpendicular to each other), and because of that orientation, neither an MMX interferometer nor a sapphire resonator are going to be able to pick up an invariance to the speed of light simply because, if the Earth isn't moving around the sun, there will be no variance of light to detect. So you can have all the "insane precision" you want. It merely shows, with even more precision, that the Earth isn't revolving around the sun,

at least from the geocentric perspective. But later we will see why it also denies your heliocentric perspective of light speed invariance.

DP: On the Luminiferous/Electropon Ether: Now, more broadly on ether experiments, yes, I have objections to your explanation concerning Michelson-Morley (MMX), Michelson-Gale (MGX), and the luminiferous/electropon ether (below just “ether”. This must be distinguished from the second flavor of ether in GWW, the “Planck ether” which GWW states cannot be detected by today’s interferometers: see GWW1, p. 619.)

RS: It doesn’t matter what the ether is made of. Whatever ether is, it was measured by the 1925 MGX at 98% of what was expected, and that is a fact of empirical science. Thus it detected the daily rotation between Earth and space.

Conversely, the 1881 – 1930 MMX-type experiments and the current sapphire resonators, using the same ether principle but in a different mounting than MGX, did not measure a revolution of the Earth around the sun. Those are the facts.

You choose to answer the MMX-type results by assuming there is no ether and making light speed constant. But then you are stuck with MGX, which can’t be explained by assuming there is no ether and that light speed is constant. If you will, the 1925 MGX measured the ether at “an insane level of precision,” and it also measured differences in the speed of light between the two tubes. That is your dilemma. If you can’t explain MGX, then you really have no explanation for MMX.

DP: Basically my position is this: There is no coherent ether model that can make sense of the results from both MM and Sagnac interferometers. Taken as a whole, interferometer experiments demonstrate that the *ether does not exist*. Therefore, by itself failure to detect it lends no support for or against a moving Earth or a motionless Earth.

RS: Your reasoning is illogical. Again, the 1925 MGX measured the exact amount of ether expected for a relative rotation between Earth and space. So we know there is an ether, since we must acknowledge that some kind of substance in the vacuum tubes made the light split into interference fringes on the receiver in the MGX experiment.

We also know that the most plausible reason why the 1887 MMX didn’t detect any ether is not because the ether does not exist (since we see the ether in the MGX experiment) but because the Earth isn’t moving against the ether, and that is because the Earth is not revolving around the sun. The logic speaks for itself. Your challenge is not so much with

MMX or Sagnac. Your challenge is answering the dilemma you have between the 1887 MMX and the 1925 MGX.

DP: I unpack this in significant detail below, as I didn't do an adequate job of that on the show, imo. Here are some baseline facts to keep in the forefront of this discussion:

DP: the thesis of GWW is that both MM and Sagnac interferometers register positive results because of the existence of the ether and that these positive results prove that the ether exists.

RS: I don't depend on MMX for evidence of ether's existence. In fact, MMX wasn't supposed to detect any ether drift if the Earth isn't moving around the Sun against the ether. I depend on MGX for the ether's existence. I then use the fact that MGX found 98% of the expected ether as a possible reason that MMX picked up a fraction of the ether, although that latter conclusion is still up for debate.

DP: The model presented by GWW does not predict the ether drift to be zero. Rather, the geocentric model requires there to be at least a 0.46 km/sec ether drift around the Earth at its equator, dropping to zero at the poles (~0.38 km/sec at Mount Wilson, where the original MMX was done.) As Martin Selbrede says, quoted in GWW, "Certainly, we expect to see that rotation, because if space is rotating diurnally every 24 hours around the Earth, then that so-called scouring effect, the drag, is going to be very real and we are going to measure it" (GWW1, p. 77).

RS: No, we don't expect 0.46km/sec for the 1887 MMX. The problem is that you keep confusing MMX and MGX. They are two separate experiments designed to detect two different things (e.g., a revolution and rotation, respectively). Hence, the ether drift in MMX would be predicted to be zero (since the Earth does not revolve around the sun).

DP: Thus I think that the statement in your latest email is incorrect: "the closer we can come to a zero result...the better it is for the geocentrist." A much-less-than 0.46 km/sec result is incompatible with geocentric predictions of an ether drift caused by the universe's alleged rotation around the Earth.

RS: Again, you are confusing the two experiments. The correct way to say it is, the closer we can come to a zero result for an MMX-type experiment, including all sapphire resonator experiments, the better it is for the geocentrist, since it shows there is no revolution of the Earth around the sun. Likewise, the closer we can come to an ether drift in the 1925 MGX commensurate with a 0.46km/sec daily rotation between Earth and space, the better it is for the geocentrist. Since MGX measured 98% of the ether

drift expected for a 0.46km/sec rotation, we have all the evidence we need, not only for a daily rotation but for the existence of the ether, since MGX could only measure ether, since the experiment was done in a vacuum, not in a gaseous medium.

DP: GWW states that this daily ether drift was detected by Michelson-Morely: “The 5 km/sec shows that at least something was present for which they had to give an explanation, for vacuums in space do not give such resistances...This value fluctuates depending on the latitude and altitude of the apparatus, as it should in principle. Apparatus closer to the equator should register higher speeds, whereas those at the poles should register near zero. Similarly, lower altitudes should register slower speeds” (GWW1, p. 565n1024).

DP: GWW says that the Sagnac effect is due to the influence of the ether: “Clearly, there were two different speeds for the light beams traveling the same distance. So what is making one of the light beams travel slower? Sagnac said it was due to the ether impeding its velocity – a resistance that is easily generated by rotating the table” (GWW1, p. 584) and “Sagnac’s results would be positive proof for the absolute rotation of the universe around the Earth, as well as for the existence of ether and absolute space” (GWW1, p. 585) and “Sagnac proved that there is ether that the light has to pass through, a formidable challenge to Einstein’s theory of Relativity that claims there is no need for ether” (GWW2, p. 166.) Cf. GWW2, p. 208.

DP: GWW also says that it is this ether that was detected by the Michelson-Gale experiment (MGX): “the same ether that caused the 1925 Michelson-Gale experiment to measure an ether-drift of a 24- hour period...is the same ether that causes a Foucault Pendulum at the North Pole to rotate 360 in a 24-hour period” (GWW1, p. 168) and “Something was affecting the light in order for it to consistently produce the fringe displacement. Sagnac (1913) and Michelson (1925) demonstrated it was ether... the ether circling around a fixed-Earth” (GWW1, p. 590).

DP: To summarize: According to GWW, there is a luminiferous/electropon ether rotating around the Earth every 24 hours.

RS: We don’t state dogmatically that it is an electropon ether. As scientists, we are trying to explain all physical phenomena by reducing it to its basic components. Since there seems to be ample evidence from Carl Anderson’s 1932 experiments for electron-positron pairings in free space, we posit this as the best explanation so far.

DP: At the equator this should register as an ether drift of 0.46 km/sec, diminishing to 0 km/sec at the poles. According to GWW this ether drift was detected by both the

MMX and the MGX, that is, both MM and Sagnac interferometers should detect this daily ether drift.

RS: No, and that is because you keep confusing the two experiments. MGX and SAG picked up a full ether drift. MMX did not, since it was oriented to detect a revolution of the Earth around the sun, where as MGX was oriented to detect a daily rotation and SAG was oriented to detect absolute motion.

DP: Problems With GWW's Ether Model:

DP: As acknowledged in GWW (see point above), an MM interferometer should detect the ether rotating around the Earth. This is contrary to what was argued in the Non Sequitur discussion and the follow-up email on 07/07/18.

RS: No, it wasn't different. The MMX was not built to detect rotation and thus it will not detect rotation.

DP: What I think was missed is that MM interferometers are rotated regularly as they take readings. Therefore, at certain times the beam would be partially or fully running against the purported diurnal ether drift and should register as a variance in the speed of light. Thus, MM interferometers should be fully capable of detecting diurnal ether drift, if it exists, and GWW insists that MM actually did so with their interferometer.

RS: No, an MMX interferometer is not going to "detect the ether rotating around the Earth," simply because an MMX is not oriented to detect rotation, only revolution. You are grasping at straws trying to make an argument that since the MMX table was rotated, this means that it would have to pick up a full ether drift. The MMX was on a table and rotated so that each of the arms, in turn, would face the presumed direction of the Earth's presumed motion around the sun, and never were the arms facing the direction of the Earth's presumed rotation.

DP: Thus, according to GWW and the physical facts of the experiment, MM interferometers should be registering a 0.46 km/sec ether drift at the equator, which diminishes as one nears the North Pole.

RS: No, again, since you have the wrong concept of MMX and are misinterpreting GWW as a result. Even Thomas Roberts' paper that you submitted about Miller's experiment says in footnote 7: "The variation due to the rotation of the earth is negligible, because during a run it is less than 6% of the angle between markers, and

corresponds to a measurement timing error of less than 0.2 seconds, smaller than the reaction time of the human observer.”

DP: In several places in GWW the authors point to the results of the Michelson-Morley and Miller experiments being ~ 5 km/sec. This approximately an order of magnitude too high for what they would expect.

RS: The 5km/sec is just an average of all MMX-type experiments, especially when we are confronted with Miller’s results of 8-10km/sec, which throws the others out of whack. In other places in GWW we have 1-4km/sec, such as this paragraph:

With the knowledge that light can be affected by, and produce, physical effects when it interacts with atomic particles, then observing consistent interferometer results of 1-4 km/sec over the course of more than 60 years (*i.e.*, 1867-1932) should have suggested to them that light was being physically affected by some kind of substance in space. Unfortunately, as we know all too well, strong but unproven presuppositions (*i.e.*, that the Earth was revolving around the sun at 30 km/sec) prohibited them from making that crucial link. (GWW, Vol. 1, p. 645, 12 ed).

DP: Thus, GWW seems incorrect when it states “As we will see later, the ‘shifts in the interference fringes’ were commensurate with a 1,054 [sic] miles per hour speed in a 24-hour rotation” (GWW1, p. 77.) The tangential speed of the surface of the Earth at the equator is actually 1040 mph, which translates to 0.46 km/sec. The MMX and Miller’s work was done in the United States, so the figure for, say, Mount Wilson, CA would be more like 0.38 km/sec. This is a significant deviation from the geocentric model’s prediction, but GWW says repeatedly that M-M and Miller’s results of ~ 5 km/sec were essentially accurate.

RS: Not quite. You cut off the paragraph you quoted from GWW right where it begins to deny your thesis. The paragraph says:

As we will see later, the “shifts in the interference fringes” were commensurate with a 1,054 miles per hour speed in a 24-hour rotation (of either the Earth rotating within a fixed universe or a rotating universe around a fixed Earth) but were nothing near what was required of an Earth revolving around the sun at 66,000 miles per hour.

In other words, I was referring to the 1925 MGX experiment when I said “of either the Earth rotating within a fixed universe or a rotating universe around a fixed Earth,” but which you cut out of the quote. I was not referring to the MMX experiment, since, as I go on to say, the MMX was about “what was required of an Earth revolving around the sun at 66,000 miles per hour.”

DP: As I mentioned on the show, Dr. Thomas Roberts has demonstrated that M-M and Miller did not record any statistically valid positive signal at all. See [“An Explanation of Dayton Miller's Anomalous "Ether Drift" Result.”](#)

RS: Well, I'll leave aside that Roberts' paper is merely the opinion of someone who isn't published in a peer-reviewed journal; that he is the sole person in this paper on his test of Miller's results; and that his abstract admits that he already has his heart set on defending Special Relativity. Laying that aside, I don't know how this paper is going to help your case. The fact remains that the lower we can make the results of the MMX-type experiments, the better it is for the geocentrist. Miller's results have always been an anomaly because his results are at least twice as high as everyone else's, so, at the least, I'm glad that someone reduced the size of his results by some statistical analysis.

DP: Thus, their results are fully compatible with later interferometer experiments which have upper bounds on the variance of the speed of light approaching closer and closer to zero.

RS: You state the “results are fully compatible with later interferometer experiments which have upper bounds on the variance of the speed of light approaching closer and closer to zero,” but what you ignore is that the same results can be used to say that the reason the speed of light isn't changing is because the light beam is not moving against the ether since the Earth is not revolving around the sun. In fact, a non-moving Earth was understood as at least one answer to the null result of the 1887 by many scientists and authors, one being Einstein's biographer, stating:

The problem which now faced science was considerable. For there seemed to be only three alternatives. The first was that the Earth was standing still, which meant scuttling the whole Copernican theory and was unthinkable.³

Other physicist saw the same possibility:

The data [of the interferometers] were almost unbelievable.... There was only one other possible conclusion to draw – that the Earth was at rest. This, of course, was preposterous.⁴

Always the speed of light was precisely the same....Thus, failure [of Michelson-Morley] to observe different speeds of light at different times of the year suggested that the Earth must be 'at rest'...It was therefore the 'preferred' frame for measuring absolute motion in space. Yet we have known since Galileo that the Earth is not the center of the universe. Why should it be at rest in space?⁵

³ Einstein: *The Life and Times*, 1984, pp. 109-110.

⁴ Bernard Jaffe, *Michelson and the Speed of Light*, p. 76.

⁵ Adolf Baker, *Modern Physics & Antiphysics*, pp. 53-54.

In the effort to explain the Michelson-Morley experiment...the thought was advanced that the Earth might be stationary....Such an idea was not considered seriously, since it would mean in effect that our Earth occupied the omnipotent position in the universe, with all the other heavenly bodies paying homage by revolving around it.⁶

Even Michelson couldn't avoid the implications of his experiment:

This conclusion directly contradicts the explanation of the phenomenon of aberration which has been hitherto generally accepted, and which presupposes that the Earth moves.⁷

So, at the least, it is presumptuous for you to claim that a null result demonstrates an isotropic speed of light. The reason an isotropic speed was the preferred solution was, as noted above, no one wanted to believe the Earth was motionless. But that's not science, as much as it is prejudice. The same prejudice is applied to your interpretation of the sapphire resonator results.

Again, your dilemma is in confronting the results of the 1925 MGX, since it shows that ether exists since there is no other explanation for the resistance to the light beams that could be causing the full fringe shifts in the receiving plate in MGX. This acknowledgement then leads us to conclude that there was little or no ether drift in the MMX because the Earth is not revolving around the sun. It's very simple.

More importantly, you ignore what Roberts says in his final analysis:

This re-analysis of his data derives a value of zero with an upper limit of 6 km/s (90% confidence level) on the "absolute motion of the earth", which is fully consistent with related experiments and the prediction of Special Relativity. (p. 2).

Notice it says, "...with an upper limit of 6km/s" at "90% confidence level." So, after all this attempt to discredit Miller's findings, the best Roberts can come up with is anything between 0.0km/sec to 6km/sec. But this upper limit of Roberts' margin of error is even higher than our 1-4km/sec or our average of 5km/sec.

Roberts further indicates that the 0.0km/sec to 6km/sec is "fully consistent with...the prediction of Special Relativity." How so? SRT predicts a null result, not a partial result. The whole reason Einstein attacked Miller was that if there was ANY ether present, then SRT would be nullified. In a letter Einstein once wrote to Edwin E. Slosson, he states:

⁶ Arthur S. Otis, *Light Velocity and Relativity*, p. 58.

⁷ Albert A. Michelson, "The Relative Motion of the Earth and the Luminiferous Ether," *American Journal of Science*, Vol. 22, August 1881, p. 125.

My opinion about Miller's experiments is the following.... Should the positive result be confirmed, then the special theory of relativity and with it the general theory of relativity, in its current form, would be invalid....Only the equivalence of inertia and gravitation would remain, however, they would have to lead to a significantly different theory.⁸

So Roberts' error margin is not really going to help you, especially since the closer the MMX result goes to zero, it remains quite a cogent argument to say that a non-moving Earth is the simpler answer to the near-zero value as opposed to the contortions of Special Relativity in which lengths shrink and time dilates, in addition to having to throw out the very ether upon which Maxwell's and Hertz' equations are based but which worked quite well. Likewise, for Michelson-Morley, Roberts says:

Michelson and Morley (1887) analyzed their data using a data reduction algorithm quite similar to Miller's, and therefore their result suffers from the same serious flaws discussed above. They did, however, have a smaller systematic error, and they contented themselves with putting an upper bound on the earth's speed relative to the ether of 7.5 km/s.

But, of course, those same "serious flaws" are going to give a margin between 0.0km/sec and either 6km/sec or 7.5km/sec. Anything significantly less than 30km/sec means the Earth cannot be revolving around the sun. Then, it is just a matter of figuring out where the 6-7 km/sec came from, whether it is was from too many errors or whether it came from the same ether that MGX picked up in full many years later, or perhaps something else. In either case, you have not increased the validity of SRT nor have you decreased that a motionless Earth is the reason for the MMX and Miller results. Roberts has actually done us a favor, rather than discrediting geocentrism.

DP: More modern MM-style interferometers have driven the upper limit of invariance of the speed of light down to a remarkable 0.3 nm/sec, or ~12 orders of magnitude lower than the geocentric model predicts we should observe.

RS: As I said, you can drive it down as far as you want. The simplest answer—and the one that Einstein didn't want because of its theological and cultural ramifications—is an Earth motionless in space, since such a model will register no ether drift.

DP: This is strong observational evidence that the ether does not exist.

RS: No, but I would say it is strong evidence of your ignoring of MGX, which measured 98% of the expected ether drift, and the only ether drift that geocentrism claims. Even

⁸ July 1925. As quoted from the paper by Dr. James DeMeo: "Dayton Miller's Ether-Drift Experiments: A Fresh Look," 2002.

the *New York Times*, so favorable to Einstein at other times, admitted that the 1925 MGX produced the very ether Michelson had been looking for forty years. It reads:

‘The register in the flight of these beams was an instrument known as the interferometer, which Professor Michelson has been perfecting for forty years. Through it was visible a white circle striped with vertical fine lines like hair drawn tightly across the face of an oval mirror. These were called interference fringes due to the fact that if the beams reached home at different times it would be recorded by a displacement of these lines. This displacement was shown in the experiment.’ (January, 9, 1925).

DP: Thus, no ether is needed to explain the original MMX.

RS: I never said there was a need. If the Earth isn’t moving, then there is no need for me to invoke ether, since I don’t have to account for an ether drift in MMX. I only need to account for an ether drift in MGX, which I have done.

Conversely, although you need no ether for MMX, you still have a moving Earth with which to contend. A moving Earth will force you to invent other *ad hoc* reasons why you can’t detect the Earth moving if you have no absolute frame (e.g., ether drift) to detect it. You will then invent things, without proof, such as the idea that Michelson’s interferometer shrunk due to its motion around the Earth; and that the time it travels around the sun has to dilate due to that same motion, and its mass must increase. Sorry to say, my friend, Rube Goldberg would be proud of you.

Your previous statement that the Lorentz contraction wasn’t seriously considered is also wrong, since Einstein fully adopted it. The only difference between Lorentz’s transform equation and Einstein’s transform equation was that Lorentz based his on ether and Einstein based his on relative motion, but both provide the same results to length, time and mass.

DP: Physicists note that Sagnac interferometers work on a different principle not requiring ether, therefore it need not exist to explain their operation. To quote Dr. MacAndrew, “in the Sagnac effect, light beams don’t travel the same distance...So it’s not two light beams traveling the same distance at different speeds.” No ether is needed to explain Sagnac.

RS: That’s going to be hard to prove. On the table, the distance from the splitter to the mirror stays the same, whether the table is rotated or not. So if the distance is the same in each case, why do fringe shifts appear only when the table is rotated? The only way there could be a change in “distance” is if the motion of the mirror, after the light is discharged, is measured with respect to the lab, but how does the mirror know the lab

even exists? Is there some kind of ether between the mirror and the lab that is measuring a change in distance between the splitter and the lab? If there is, then you're in my camp, not MacAndrew's. See <https://www.youtube.com/watch?v=SWmlimH7laY>

Be that as it may, the Sagnac effect is seen in many places, since it is an established fact that two beams of light heading in different directions are going to have a discrepancy in their speed. This is shown by the Sagnac correction that is built into the GPS system to make it work. EM waves going east-to-west go faster than EM waves going west-to-east, but the distance between the GPS satellite remains the same, and thus the GPS computers have to be adjusted by the Sagnac results to account for the anisotropy of the EM waves. So, Dr. MacAndrew can claim all he wants that the light beams are not traveling the same distance and the light speed remains constant, but that is not what the GPS shows us, and he can't prove it from the Sagnac experiment itself. It shows us the distance remains the same and the speed of light changes.

By the way, the geocentrist has no problem with the GPS system, since it works exactly as we predict. Since space is rotating east-to-west against a fixed Earth, the speed of that space (which would be 0.46km/sec), is going to be added to the speed of the light traveling through that space, so it is c plus 0.46km/sec. Likewise, a light beam going west-to-east will be moving against the speed of space, and thus its speed will be c minus 0.46km/sec. The difference between the times of arrival will be about 50 nanoseconds. So again, the geocentric system is confirmed as answering the data, and you have no way to disprove it.

DP: Thus modern physicists predict that a Sagnac-style interferometer would be able to detect the Earth's rotation, via the Sagnac effect, but that a MM interferometer would not detect any variance in the speed of light due to ether, since it doesn't exist. This is what we observe.

RS: Well, you first need to prove there is a change in distance between the splitter and the mirror in the Sagnac experiment. Your suggestion is, as they say, using as proof (a change in distance) for the very thing you're trying to prove (a change in distance). The only thing you could possibly claim is that a rotating table is not an inertial frame and thus Special Relativity doesn't apply. But then you are forced to General Relativity for an answer, but General Relativity does not have a speed limit for light, nor is light constant, and thus you have no recourse to claim that the Sagnac effect is due to the distance changing as opposed to the speed of light changing.

As for the MMX, since we've already shown, along with the New York Times, that ether does exist by the clear results of MGX, your declaring that ether doesn't exist means the burden is completely on you. Since a viable interpretation of MMX is that the Earth is

not moving through the ether and thus we will get a null result, then the burden to then claim there is no ether and the Earth is moving but of which you have no way to detect, becomes an extreme burden of proof.

DP: To summarize: Geocentric theory predicts that we should detect a ~ 0.38 km/sec ether drift in latitudes equivalent to North America.

RS: No, it doesn't predict a 0.38km/sec ether drift. If you remember, the 0.38km/sec came from your arbitrary juxtaposition of the MGX with the MMX, and from that false supposition, you insisted that the MMX should be measuring 0.38km/sec. It should be measuring zero, and that is confirmed by the sapphire resonators.

DP: Modern interferometers have measured the invariance of the speed of light to an upper bound of 0.3 nm/sec. Thus experimental observations do not support the existence of a luminiferous/electropon ether.

RS: No, you're jumping the gun again. All modern interferometers, from MMX to sapphire resonators, assume the Earth is traveling around the sun at 30km/sec. This then leads them to presume that if their light beam is not affected by that 30km/sec speed, then this proves the speed of light is invariant. No it doesn't. The reason is, you can't assume the Earth is moving 30km/sec before you do the experiment or make any conclusions.

This is the inevitable trap that modern science has fallen into, and they will never get out of it until someone asks the right question: "Hey, have we first proven that the Earth moves around the sun before we declare that light speed is invariant?" Some day in the future someone with some influence is going to give the right answer to that simple question, and the answer is NO.

So, David, until you can prove to us that the Earth moves around the sun at 30km/sec, you have no right to tell us that light speed is invariant, or that there is no ether, or that Special Relativity is correct, or just about anything you have concluded about the universe by assuming that the Earth moves.

DP: How Do Modern Geocentrists Get Around These Experimental Observations?

RS: I beg to differ. It appears that the one who is trying to get around these experiments is you, and that can be easily seen by how you ignore the implications of the 1925 MGX, but cleverly try to evade it by juxtaposing it with the 1887 MMX.

DP: Modern geocentrists get around the experimental observations from MM and Sagnac interferometers in two ways: 1) by positing that the ether is shielded by material interference and 2) that the medium through which the light travels in the interferometer is crucial to its ability to detect the ether.

Argument #1 – Shielding – the ether is allegedly shielded by material substances:

“One reason Joos’ results may have been low...is that the electrons in Joos’ metal covering created a Fermi surface and thus partially shielded the apparatus from the ether’s movement. [Galaev] writes: ‘It is the same as making the attempt to measure the wind, which blows outdoors, looking at the anemometer in a closed room’” (GWW1, p. 571f.) “Detection of an ether wind was virtually impossible if it was almost completely blocked out by surrounding structures like the laboratory walls or the apparatus itself” (GWW2, p. 304). “The experimental care taken in [the Holger Müller’s 2002 experiment] is impressive, but futile, if intended to detect the influence of the ether on [the speed of light]. Lessons learned long before have been forgotten. The experimenter’s text below indicates the missteps taken: solid silica and sapphire crystal; and vacuum-sealed, instead of a gaseous medium....It is also a safe assumption the experiment was performed in a laboratory, buried in the bowels of a building. Can sunlight be detected in a windowless cellar? What value would be placed on a null result of $< 10^{-15}$ for sunlight detection, if the cellar shielded the detector from the sun?” (GWW2, p. 271f.).

Cf. also GWW2, pp. 292, 293, 296, 304, 315, and 363.

DP: Problems for the Ether Shielding Argument:

1. **DP:** The original MMX was done in the basement of a building, but still allegedly registered what GWW considers a full ether drift measurement: "The Michelson-Morley experiment was performed in a basement, violating almost all of Miller’s rules for ether detection and avoiding material dragging" (GWW2, p. 305). But nevertheless, "When daily temperature drift is factored out and no wind direction assumed, the 1887 Michelson-Morley experiment shows a fringe shift approximately equivalent to the 10 km/s found in Miller’s experiments" (*ibid.*) How can this be if the ground shields the ether?

RS: Again, this shows how you are twisting the evidence, or worse, you don’t really understand the interferometers. You say that the 1887 MMX “registered what GWW considers a full ether drift.” This is false. A FULL ether drift would be 30km/sec in the MMX, since that is the presumed speed of the Earth around the sun. But no MMX-type

interferometer has ever come close to 30km/sec, but that is what is needed for anyone to claim he has evidence for the absolute motion of the Earth.

But this is all water under the bridge. The reason is that the 1925 MGX is the only interferometer that measured a FULL ether drift, but that interferometer was the only one which was measuring for a daily rotation between Earth and space, NOT a revolution of the Earth around the sun. For the geocentrist, there isn't a revolution of the Earth around the sun, but there is a daily rotation of space around a fixed Earth, and thus it stands to reason why the MGX had a FULL ether drift and the MMX either had none or an anomalous small fraction of what was needed.

Moreover, there does not exist a peer-reviewed paper that has ever disputed the results of 1925 MGX, much less disprove them. In fact, if anything, the results of that experiment are virtually kept silent in modern academia. I believe there is a good reason for this silence, for if it became known that the same principle of ether-drift was used in two different experiments (MMX and MGX) measuring two different things (revolution v. rotation) and the former showed no drift but the latter showed a full drift, the physics world would be in a total conundrum. It would virtually prove that the Earth was motionless in space and that the universe rotated around it. The option that the Earth could be rotating but not revolving around the sun would not be possible, because in that scenario the Earth could not show the seasons, only day and night.

So, the heliocentrists spend all their time trying to show that MMX-type experiments are null and then try to claim this means light is constant and the Earth moves. This takes our eyes off the more important results in the 1925 MGX experiment in which the ether exists and the speed of light is not constant (besides the option that the alternative interpretation of MMX is that the Earth doesn't move and light is not constant).

2. **DP:** GX was done inside thick-walled pipes (12" water main pipes), yet detected what GWW and Bob on the Non Sequitur show say was a full ether reading. Should not the pipe walls have shielded the ether, at least partially?

RS: Perhaps the walls did "partially" block the ether and that is why MGX got 97.6% of the expected ether drift instead of a full 100%. The fact remains, however, that MGX found, within the acceptable margin of error, the precise expected ether drift for a daily rotation between the universe and the Earth. Despite whatever could have been blocked, the results of MGX show us that the ether is discrete enough in its composition that it can penetrate, to a very high degree, even 12" cement pipes, and even show itself in a vacuum.

So your claim comes back to bite you, and rather hard. For if there was any interferometer that should not have readily shown an ether drift, it would be the MGX, since it was shielded by 12” pipes and was done in a vacuum. But as we know, it was only the MGX that ever showed a FULL ether drift. Any reasonable scientist would have to conclude that the reason MGX showed a full ether drift was because its interferometer pipes were pointed directly in the path of the ether. He would also be compelled to conclude that the reason the MMX-type interferometers, including the sapphire resonators, could detect very little or no ether was because their arms were NOT pointing directly in the path of the ether. It’s really very simple.

3. **DP:** Modern ring lasers are buried deep underground, yet easily detect the rotation of the Earth and are even sensitive enough to detect annual and Chandler polar wobble. GWW’s model says this would be because it’s detecting the ether. The Gross Ring G in Bavaria, Germany “is buried some 20 feet underground in a pressurized cabin that compensates for any change in ambient pressure to keep the laser chamber stable” ([link](#); see picture below – presumably this pressurized cabin has metal walls.) The ring laser in Christchurch, New Zealand is 30 meters underground. The GINGERino ring laser in Gran Sasso, Italy is a whopping **1400** meters underground ([link](#)). This seems incompatible with the GWW claim that “laboratory walls or the apparatus itself” can shield the ether and invalidate the results.

RS: Again, you are on the wrong track. Notice he says: “Modern ring lasers are buried deep underground, yet easily detect the rotation of the Earth and are even sensitive enough to detect annual and Chandler polar wobble.” Actually, the only thing the ring lasers detect is a daily relative rotation between Earth and space, not necessarily a “rotation of the Earth.” Obviously, a ring laser, which is based on the Sagnac effect, doesn’t have the capability to determine whether the Earth is rotating in a fixed space or space is rotating around a fixed Earth. So all of your research into ring lasers, impressive as it is, doesn’t prove anything for you, except to dig your hole a bit deeper, for now you have ample evidence that the MGX detection of a relative rotation between Earth and space has been verified by some of the most sophisticated instruments man has ever built. In effect, your new crusade about “shielding” has led you into a trap that you cannot escape from, and as such, you have virtually proven for us that the Earth doesn’t move. Let’s play this out...

As it stands, what you can’t show from some of the most sophisticated instruments man has ever built (e.g., sapphire resonators) is that the Earth revolves around the sun. For if the “modern ring lasers...easily detect the rotation of the Earth,” then why can’t either the ring lasers, perhaps oriented differently, or some other sophisticated equipment like the sapphire resonator, detect the REVOLUTION of the Earth around the sun?

The dilemma for you is hard but simple. If they can detect a full rotation (without anyone making claims of the ring laser being shrunk or its time dilated or its mass increased), then why can't they detect a REVOLUTION of the Earth around the sun? It stands to reason that somewhere in all that sophisticated equipment that we should be able to detect a REVOLUTION if we can detect a ROTATION. But the fact is, no one has. And the truth is, no one ever will.

But you will have what appears to be a clever answer for this—the same one Einstein tried to pass by us in 1905 with his Special Relativity theory. You will claim that the reason MMX couldn't detect the revolution of the Earth around the sun was because, every time they tried to measure the Earth's speed with Michelson's apparatus, the Earth's movement caused Michelson's apparatus to shrink, and the shrinking made it look like the light beams were coming back to the receiver at the same time, and this result made it look like the Earth wasn't moving in space.

First, this would be considered the logical fallacy of *petitio principii*, that is, using as proof the very thing they are trying to prove. In other words, you can't assume the Earth is moving in order to prove that the Earth is moving. Ironically, Einstein's General Relativity, developed 10 years later, would show in graphic detail that all the supposed proofs they claimed to have had for a moving Earth were all discredited by the general principle of relativity.

Second, the idea that Michelson's apparatus shrank during the experiment is as "ad hoc" as ad hoc could be. There was no evidence that matter shrank when it moved, but a possible shrinking of matter is all they could come up with for an answer.

Despite the fact that they had no proof the Earth was moving around the sun, they kept insisting the Earth is moving around the sun, and they continued to attempt to answer Michelson's 1887 experiment from that vantage point.

As such, they further claimed that because the shrinking caused it to appear as if there was no difference in the speed of the light beams, all they needed to do next to make it impressive was to represent the shrinking in a mathematical equation ($\beta = \sqrt{1 - v^2/c^2}$ or $\beta = 1/\sqrt{1 - v^2/c^2}$, depending from which end the measurement is made) to show why, in their view, the light beams had no difference in speed. At the same time, they could allow themselves to conclude that light speed is always the same, regardless if the Earth is moving. So in this scenario, they made light constant instead of allowing the Earth to be constant (i.e., non-moving).

Now, some will claim that because Einstein eliminated ether and thus eliminated Lorentz's ether pressure as the cause of the shrinkage, that Einstein really didn't envision a shrinkage of Michelson's apparatus, but this is false. Not only did Einstein depend on Lorentz's original "shrinking" equation ($\beta = 1/\sqrt{1 - v^2/c^2}$) for almost every electrical or motion phenomena in science,⁹ he clearly stated that his delegated cause for the shrinkage was not ether but "relative motion," and thus Einstein affirmed the shrinkage in the following statement:

The author [Vladimir Varičák] unjustifiably stated a difference of Lorentz's view and that of mine concerning the physical facts. The question as to whether length contraction really exists or not is misleading. It doesn't "really" exist, in so far as it doesn't exist for a co-moving observer; though it "really" exists, i.e. in such a way that it could be demonstrated in principle by physical means by a non-co-moving observer.¹⁰

So, as you can see, the "shrinking" remained, although different causes were assigned to it by Lorentz and Einstein, respectively. Why were they so insistent on this fudge factor? Because without it they could not tell the difference between something moving and something not moving, which is very bad for physics, since the whole science is based on detecting and measuring the movement of bodies. So they had to assume the Earth was moving, and then they had to explain why they couldn't detect it moving, and that answer, hapless as it was with the "shrinking" thesis, was that nature always played tricks on them when they tried to measure the Earth's movement around the sun. The Earth was moving, but nature wouldn't let them detect it because it would always shrink the apparatus. How convenient. If we made an excuse for geocentrism using this logic our opponents would have a cow.

So today it is the same. Instead of admitting they aren't able to measure the Earth's movement around the sun, they will claim, regardless, that the Earth is moving and that

⁹ This can be easily seen in Einstein's 1905 paper, The Electrodynamics of Moving Bodies, which introduces the transform equation, $\beta = 1/\sqrt{1 - v^2/c^2}$ on page 7, and then applies it to the following scientific phenomena: (1) Physical Meaning of the Equations Obtained in Respect to Moving Rigid Bodies and Moving Clocks on page 9; (2) The Composition of Velocities on page 11; (3) Transformation of the Maxwell-Hertz Equations for Empty Space. On the Nature of the Electromotive Forces Occurring in a Magnetic Field During Motion on page 12; (4) The Theory of Doppler's Principle and of Aberration on page 15; (5) Transformation of the Energy of Light Rays. Theory of the Pressure of Radiation Exerted on Perfect Reflectors on page 17; (6) Transformation of the Maxwell-Hertz Equations when Convection-Currents are Taken into Account on page 19; (7) Dynamics of the Slowly Accelerated Electron on page 20.

¹⁰ https://en.wikipedia.org/wiki/Length_contraction#cite_note-einst1911-18, taken from *Einstein, Albert (1911). "Zum Ehrenfest'schen Paradoxon. Eine Bemerkung zu V. Varičáks Aufsatz". *Physikalische Zeitschrift*. **12**: 509–510.*; Original: Der Verfasser hat mit Unrecht einen Unterschied der Lorentz'schen Auffassung von der meinigen mit Bezug auf die physikalischen Tatsachen statuiert. Die Frage, ob die Lorentz-Verkürzung wirklich besteht oder nicht, ist irreführend. Sie besteht nämlich nicht "wirklich", insofern sie für einen mitbewegten Beobachter nicht existiert; sie besteht aber "wirklich", d. h. in solcher Weise, daß sie prinzipiell durch physikalische Mittel nachgewiesen werden könnte, für einen nicht mitbewegten Beobachter.

light speed is constant, and then they will perform very sophisticated tests to “prove that light is constant,” such as the sapphire resonator tests that measure down to 10^{-15} . In the end, it is quite ironic that you began this section of our debate with the statement: “Modern geocentrists get around the experimental observations...” But we have seen that, if there is anyone trying to “get around” the experiments with ad hoc explanations it is you and they.

Nevertheless, they expect the public to be thrilled over the resonator evidence as if it, once again, confirms Einstein’s postulate that the speed of light never varies, when in reality, they never tell the public the important caveats—(1) that they do all the tests assuming the Earth is moving around the sun, and (2) that the possible reason the tests are measuring null is because the Earth isn’t moving; and (3) that if the Earth were actually moving then the results would not be null, but would, pound for pound, be proportionately the same result that the 1925 MGX registered when it tested for the relative rotation between Earth and space—a full positive ether drift result showing that the speed of light varies.

In other words, the whole science community seems to be pulling the wool over our eyes. You are especially guilty since, claiming to be a Catholic who abides by Catholic tradition, Scripture and the Fathers, you ignore all three of those authorities who tell you that the solution to the \$64,000 question of whether the speed of light is constant or the Earth is moving, is that the Earth isn’t moving. You know a non-moving Earth is a viable answer to the empirical evidence; you know that you don’t have an answer to the 1925 MGX; you know you have no proof for a moving Earth and thus you now try to resort to Rube Goldberg-type arguments, but you lose there, too.

So what is holding you back from at least considering that a non-moving Earth answers the questions? Is it because, after all these years of your vicious attacks against me you can’t bare to face the reality that you could, in fact, be wrong about me and geocentrism?

4. **DP:** It will not work to substitute the so-called “Planck ether” to explain this anomaly. See point 1 below where GWW says that electropon ether is “traceable” while ether “in the Planck scale” is “untraceable” (GWW1, p. 619.)

RS: It’s interesting to see you pursue this red herring. Perhaps you think you are going to find some anomaly in my geocentric thesis by examining my theory of what constitutes the ether. If so, you’re on the wrong track. The fact remains that an ether was found in the 1925 MGX and you cannot refute it, especially since it returned the exact amount of ether that was expected for a daily rotation that you yourself verified by “ring lasers.”

In the end, you can call it “ether” or “schmeather” or “Leave it to Beaver”; and you or I can suggest it is made of Planck particles or electropons or neutrinos or proton-antiproton particles, quantum foam or even rarified air. It makes no difference because although we may not know its exact composition, we do know that whatever it is, it was the cause of the interference fringes in the 1925 MGX, a fact that you have avoided like the plague.

By the way, the error bars of Roberts on Miller and MMX aren’t going to help you here since not only did Roberts do no test on MGX, his error margin for the ether detection of Miller and MMX of “0.0 to 6km/sec” can’t even touch what was found in MGX, since with a 98% detection of the expected ether, there is no appreciable or even credible error bar Roberts could present to nullify the results. No wonder the science community avoids MGX like the plague.

5. **DP:** GWW approvingly cites the work of Craig Hogan at Fermilab who “is seeking to detect the [quantum] foam”: “By using two Michelson interferometers stacked on top of each other, he intends to probe the smallest scales in the universe, the distance at which both quantum mechanics and relativity break down—the region where information lives as bits. The planck scale is not just small—it is the smallest” (GWW1, p. 208; citing a 2012 article in Scientific American.) But GWW ignores the fact that it should be a cake walk for such a dual-MM interferometer with the potential to detect invariance on the Planck scale to detect the luminiferous/electropon ether on the atomic scale. But it does not.

RS: You keep making the same mistake over and over again. Once again, your ploy is to find a discrepancy for composition I suggested of the ether. In reality, you are actually accumulating evidence against yourself. Let’s go over this again so we’re clear on it; and excuse me if I appear repetitive.

As noted, you must assume the Earth is moving, whether you can prove it or not. But since the MMX, the sapphire resonators, and even the “dual-MM[X] interferometer” have not produced a variance for the speed of light, you think this proves there is no ether, but it doesn’t. Why? Because if the Earth isn’t moving then the resonator will register the same null result whether the ether is or is not in existence.

In your model, the Earth is moving around the sun and there is no ether against which it is moving. But this flies in the face of the fact that the 1925 MGX demonstrated the ether’s existence, and no one has disproven it. Hence the only logical solution is that the resonator is registering null not because there is no ether but because the Earth is not

moving around the sun and thus is not going through the ether in that particular direction.

Accordingly, you know, but won't accept, that a viable reason that neither the MMX, the sapphire resonators (down to 10^{-15}) and even the "dual MMX interferometer" (perhaps down to 10^{-33}) would not measure a variance to the speed of light is not necessarily because light is, in itself, invariant, but because the Earth is not moving around the sun and thus there is no ether in space that is going to be moving against. Obviously, if the Earth is not moving around the sun, then it can't be going through the ether; and if it is not going through the ether, then there is no ether that will be picked up by any of these instruments, and they will always register null and the speed of light will appear to be always constant.

But the problem for you is twofold: (1) you cannot claim that the null result means light speed is invariant, since an equally or even more plausible answer is that light could be variant if the Earth isn't going around the sun and through the ether; and (2) the 1925 MGX showed that ether exists, and that if a planet moves directly in the direction of that ether (as is the case when there is a relative rotation between Earth and space), then the ether will be detected, and thus one cannot deny that the ether exists, whatever its composition might be.

DP: Argument #2: Medium – only gas in the beam path will work to detect ether:

DP: The second way in which GWW seeks to counter the interferometer evidence that currently places the upper limit of the invariance of light at 0.3 nm/sec is to claim that interferometers will only work with a gas in the beam path:

"only a Michelson interferometer in gas-mode can detect absolute motion, as we now see. So as better and better vacuum interferometers were developed over the last 70 years the rotation-induced fringe shift signature of absolute motion became smaller and smaller....and in recent years they had finally perfected a totally dud instrument," (GWW1, p. 617).

RS: Allow me to give the whole quote. As you will see, GWW is not claiming anything about "gas-mode" interferometers, especially since the 1925 MGX was not in "gas-mode" but was in a vacuum. The quote you chose comes from Reginald Cahill, someone who is against Special Relativity but still believes the Earth moves. So the purpose of my quoting Cahill was to show the contradictions in his theory, not to agree with him in his analysis. Thus I quote him as follows:

We can, however, see these same prejudices and assumptions in those who reject the results of sapphire oscillators. For example, **Reginald Cahill**, in his 2005 paper on the Michelson-Morley experiment, on the one hand, he recognizes that “only a Michelson interferometer in gas-mode can detect absolute motion, as we now see. So as better and better vacuum interferometers were developed over the last 70 years the rotation-induced fringe shift signature of absolute motion became smaller and smaller....and in recent years they had finally perfected a totally dud instrument,”

DP: “Vacuum-mode interferometers have found increasing popularity in modern experiments. Their consistency in obtaining null results for ether drift detection and thus supporting Special Relativity theory may be one of the reasons for this. No one (except Cahill) seems to have asked why gas interferometers consistently detect small speeds of 10 km/s or less, while vacuum versions find no ether motion. An absolute reference frame is indicated by gas interferometers. A theory explaining this must embrace refraction effects to be successful” (GWW2, p. 304).

RS: The above paragraph was written by my co-author, and it was written almost 15 years ago, before we had a better grasp on the situation, but even then, Dr. Bennett wasn't necessarily agreeing with Cahill since he insists that even though a gas interferometer may create an “absolute reference frame,” still, in order to claim such one must account for “refraction effects” caused by the gas, and thus Dr. Bennett is warning against accepting the high results of a gas-mode interferometer.

That being said, you are still in the same conundrum, since with vacuum interferometers we not only can get down to an almost zero speed for the Earth around the sun, but your dependence on vacuum interferometers as giving the true value for MMX-type devices forces you to accept, all the more, the results of the 1925 MGX since it was one of the only interferometers that operated in a vacuum. So once again, the evidence comes back to bite you, and bite hard.

DP: Problems for the Gas-mode only Argument:

DP: 1. GWW says that the reason an interferometer with vacuum in the path fails to detect the ether is that the ether has been sucked out when pulling the vacuum: “The real problem with oscillators or resonators is precisely the very attempt they make to help the Michelson-Morley type apparatus do their job of determining the anisotropy of space. That is, a vacuum removes all of the traceable ether in the atomic scale (e.g., electron-positron pairings) and leaves only the untraceable ether in the Planck scale (e.g., quantum foam)” (GWW1, p. 619). Setting aside how electron-positron pairs could remain stable without

mutually destroying each other, we note that such a pairing would necessarily have mass. It is not credible to assert that for hundreds of years engineers and scientists have been evacuating a medium that has measurable mass while pulling a vacuum, without ever noticing it.

RS: First, let me reiterate that when I stated in GWW that the ether on one scale is an electron-positron pairing and on another scale are Planck particles, these are only educated speculations, not provable fact. I am merely offering what I believe is a best fit for the evidence available, but I could easily relinquish both substances if something better can be offered. The one fact I DO enforce in GWW is that there is an ether, as proven by the 1925 MGX, and that ether was detected in a vacuum. So, it is apparently the case that ether is so discrete that it can occupy a vacuum “without us ever noticing it,” but still be detected by light wave interference at 10^{-7} meters.

Second, your implication that a vacuum has no mass is not provable and is illogical. The metaphysical principle that must be accepted is that “nothing” cannot exist. Hence we cannot say “a vacuum is nothing.” A vacuum is filled with something, but that something would need to be very, very far below the atomic scale, and as such it would appear to us as a vacuum.

DP: 2. This argument seems to contradict what is said elsewhere in GWW, that space itself is packed with electropon ether: “Both the planckton and electropon ethers constitute space” (GWW1, pp. 207) and “A viable interpretation of Anderson’s discovery is that space is composed of a lattice of very stable electron-positron pairs” (GWW1, p. 640) and “space consists of very dense yet very stable electropon pairings, perhaps in some type of lattice or crystalline structure” (GWW1, p. 644) and “That an electropon lattice may pervade all of open space and thus constitute the salient part of the ‘ponderable’ ether has been postulated for quite some time” (GWW1, p. 645.) It seems to be a contradiction to say that pulling a vacuum on Earth evacuates the electropon ether while space itself, which is a much harder vacuum than any that can be created on Earth, is veritably jam packed with electropon ether.

RS: Again, although this investigation into the composition of the ether is not going to prove or solve anything for you, I will simply say that if a first level ether is composed of electron-positron pairs, and since these pairings would be 20 orders of magnitude larger than Planck particles, then a vacuum, say, of 10^{-17} Torr would not contain any electron-positron pairings but would contain Planck particles.

DP: 3. As was pointed out on the Non Sequitur show, MGX was done in pipes which had been evacuated of air. It seems that the statements in GWW and on the show that MGX showed the full expected reading don't accord well with the claim above that creating a vacuum pulls out the ether (combined with the claim further above that dense materials block the ether.)

RS: You think in this manner because above you did a good job of confusing the ethers. No vacuum would have the power to divest itself of Planck particles, but it could divest itself of electron-positron pairings if the Torr were large enough.

But this is all water under the bridge as far as what you are required to demonstrate to us. You continue to dance around MGX without admitting what it actually showed. Once again, the 1925 MGX showed a light wave interference that equaled what was expected of white light exposed to an ether drift of 0.46km/sec. That is a fact. The inside of the MGX consisted of a vacuum (but I don't know what Torr level of vacuum it used). The point remains that, even in a vacuum, whether it was a high or low vacuum, the MGX measured the appropriate ether drift for a daily rotation. The obvious conclusion is that regardless of a vacuum that takes out most or all of the baryonic matter in the pipes, the ether remained present in the MGX and moved fast enough from one end of the pipe to the other end to show that the ether had a relative speed of 0.46km/sec through the pipe.

The only other possible explanation is that the pipe was moving 0.46km/sec through a fixed ether, but since a moving pipe on a rotating earth would also need to show from the MMX a revolution of the Earth around the sun in order to make it a legitimate conclusion for the heliocentric system, but they can't find an ether drift for a revolution of the Earth around the sun, and this means that the MGX explanation that the "pipe is moving 0.46km/sec through a fixed ether" is an invalid conclusion. Unless the heliocentrists can show BOTH a rotation of the Earth on its axis, AND a revolution of the Earth around the sun, from the interferometer empirical evidence, then heliocentrism stands disproven by the empirical evidence, and the only viable option is geocentrism, which only needs the rotation and which the empirical evidence provides.

DP: 4. One of the reasons given in GWW for the failure to detect ether in vacuum-based interferometers is that the refractive index (n) of a vacuum = 1. But as we discussed on the show, crystal oscillators with sapphire in the path don't detect any variance in the speed of light, to many orders of magnitude below the ~0.46 km/sec predicted by the geocentric model and the refractive index of sapphire is not 1, it's 1.77. So GWW proposes another explanation based on the supposed degree of freedom of the ether in gases compared to solids: "The value of refractive index n in transparent solids is

much greater than in gases, leading to the obvious consideration of using solid-state fibers as the light path medium in interferometry. But this extension overlooks the most significant difference between gas and solid – the degrees and types of kinetic freedom. Gas has the most freedom and least resistance to ether effects, as already seen. But atoms in a solid lattice are restricted severely to modes of material vibration about a cell center. We would expect from this (crude) reasoning that light speed would not be affected as much, or at all, compared to propagation of phonons [sic] in the transparent fiber” (GWW2, p. 304.) This is a mostly incoherent, ad hoc explanation, with no supporting evidence. It is further undermined by the next point.

RS: It really doesn’t make any difference once one knows the overall picture. Once again, if a sapphire resonator doesn’t measure “any variance in the speed of light,” a viable reason is that the Earth is not revolving around the sun, not necessarily because the speed of light is invariant. We know this because the 1925 MGX measured a variance in the speed of light, and that was because there is, even according to ring lasers, a relative rotation between Earth and space. This is especially relevant because MGX was done in a vacuum, and thus no one needs to get hung up about refractive indexes.

So you can brag about the invariance of light speed in sapphire resonators all you want, but you can’t prove anything by it. Those resonators are oriented on a MMX-type interferometer model, and therefore, we expect them to pick up little or no ether and thus exhibit an invariant light speed, since the Earth is not going around the sun. If you see otherwise, then you need to tell us why MGX measured a FULL ether drift, but neither MMX or high precision resonators didn’t, and you need to do so in the context of the obvious difference between a rotation and a revolution.

DP: 5. The Sagnac effect is observed in any medium – vacuum, gas, solids, even liquids (in the case of liquid dye lasers.) If it is the ether that causes the Sagnac effect then it would seem that this media independence undermines GWW’s assertion that only “gas-mode” interferometers can effectively detect the ether.

RS: I don’t believe we’ve ever said only gas-mode interferometers can detect the ether, and if we ever did, we were wrong, since it is obvious that the vacuum of the MGX discounts that supposition.

DP: 6. The implication expressed in GWW2 (pp. 304) that scientists prefer vacuum-based interferometers compared to “gas-mode” interferometers because the vacuum-based instruments give them the null results they desire

is unfounded. They use a vacuum to avoid thermal variations which can end up being interpreted as false positives.

RS: Yes, I would agree (irrespective of the apparent assertion from GWW to the contrary), since the vacuum of the MGX shows ether can be measured at full force. But this only digs your hole deeper, since you haven't accounted for the full positive results of the MGX. If you want to eliminate gas-mode interferometers and rely only on vacuums, so be it. It means that the MGX didn't give a false positive, and thus you are in even more trouble trying to explain that positive result within your overall system.

DP: For more on these various experiments, see Dr. Thomas Roberts' page: "[What is the experimental basis of Special Relativity?](#)" Note that he specifically interacts with many of the experiments cited in GWW in his section "[10. Experiments that Apparently are NOT Consistent with SR/GR](#)". He emphasizes:

DP: A key point is: if one is performing an experiment and claiming that it completely overthrows the foundations of modern physics, one must make it bulletproof or it will not be believed or accepted. At a minimum this means that a comprehensive error analysis must be included, direct measurements of important systematic errors must be performed, and whatever "signal" is found must be statistically significant. None of these experiments come anywhere close to making a convincing case that they are valid and refute SR. This is based on a basic and elementary analysis of the experimenters' technique, not on the mere fact that they disagree with the predictions of SR. Most of these experiments are shown to be invalid (or at least not inconsistent with SR) by a simple application of the elementary error analysis or other arguments relating to error bars, showing how important that is to the believability of a result—the authors merely found patterns.

RS: First of all, the MMX experiment was done BEFORE Special Relativity was invented to attempt to explain it. Thus MMX wasn't done to "overthrow" SRT, since SRT didn't exist at that point.

Second, Roberts was obviously in favor of SRT before he did his analysis. As such, he makes it sound as if SRT has no problems of its own, outside of the interferometer issue, but it does, and they are legion. The contradictions inherent in SRT have been the subject of many papers since the time Einstein proposed it. All of them are listed in GWW, but few people act on it because almost all of modern academia is built on Einstein's theories, and if you question his theories you will be out of a job, and that has been proven over and over again.

Third, even Roberts' own "error bars" show a margin of error in his own analysis of between 0.0 and 6km/sec, at a 90% confidence level. That wide of a margin certainly doesn't give us absolute proof of the MMX results.

Fourth, the fact that neither Roberts nor anyone else has been able to dispute the 1925 MGX speaks volumes. Obviously, Roberts error margin of 0-6km/sec versus the needed 30km/sec for MMX, leaving only 20% difference, is not going to come close to the 98% finding of the expected ether drift in the MGX experiment. The results speak for themselves.

Fifth, as far as the geocentrist is concerned, Roberts insistence that the results of MMX-type experiments were null is welcome news. It is what we would expect for an Earth that is motionless space.

DP: The GWW Model "Adapts" to Any and All Findings: One final point before my final summary is that in GWW we find that any value for the alleged ether drift is acceptable. The actual model itself would predict a 0.46 km/sec drift at the equator. But we noted above that readings of 5-10 km/sec or a reading of 0 km/sec are considered compatible with the model.

RS: So what we see here is that you have gone through this whole study without making the proper distinctions. On the one hand, the 0.46km/sec drift only applies to the 1925 MGX, since it was seeking to measure the 0.46km/sec daily ROTATION between Earth and space, and found 98% of it or 0.45km/sec.

On the other hand, the 1887 MMX, and even the MMX-type sapphire resonators, were measuring for a yearly REVOLUTION of the Earth around the sun, and needed 30km/sec to show the revolution. The best it could show was about 1-4 km/sec for the 1987 MMX, about 1km/sec from Illingworth, and the anomalous 8-10 km/sec from Miller, the average being from 3-5 km/sec, depending on how many experiments are included in the sample. We can even add Roberts' 0-6km/sec. The upshot is, no MMX-type interferometer came even close to what was needed for a REVOLUTION of the Earth around the sun.

So let's say it again in case someone missed it the first time: these results are precisely what would be expected in a geocentric universe, since the universe goes around a fixed Earth at 0.46km/sec, and the Earth does not go around the sun and therefore the MMX results are null. It's really very simple. Only someone very stubborn or who has a hidden agenda would not at least admit these results allow for a geocentric universe.

DP: And GWW elsewhere declares that even much higher values present no problem:

If, on the other hand, Miller's and Marinov's calculations of 200 to 300 km/sec are correct, this does not prove the Earth is moving through it. As Bouw notes: "Every center of revolutionary motion, such as the sun, the Milky Way, or a cluster of galaxies, each introduces another motion of the aether sweeping past the earth." In other words, if ether dragged by the movement of the sun is added to ether dragged by the movement of the Milky Way and other galaxies so that the sum is 200 to 300 km/sec of ether moving past a fixed Earth, the higher alternative readings offer no escape from the geocentric system (pp. 601f.)

So it seems to me that in GWW ether is a kind of wax nose, which can be molded any which way to fit the preconceived conclusion of the geocentric system. Is this not the very thing of which GWW repeatedly accuses modern scientists?

RS: Actually, the words "wax nose" only appears twice in the 2200 pages of GWW. It is once applied to Einstein's "observer," and once applied to Hubble's interpretation of the redshift, and all for good reason, since both molded the universe to conform to what they wanted to see, not necessarily what they saw. Einstein wanted to see a moving Earth, so he created an equation that would shorten material objects, dilate their time and increase their mass. Yes, I would call that a "wax nose" if there ever was one.

Likewise, Hubble saw that the evidence led to a motionless Earth in the center of the universe but molded the evidence to get rid of a center and replaced it with a balloon universe that expanded, without a center. Moreover, the original expansion provided only 1.5 billion years, but since that would conflict with a 4.5 billion year-old Earth and a 13 billion year-old universe needed by evolution, Hubble was told to go back to the drawing board and make his expansion go faster. Indeed, I would call that a "wax nose" cosmology.

As for Miller's and Marinov's calculations of 200 – 300km/sec, what you are leaving out is that these numbers refer to what kind of ether drift might be expected in the HELIOCENTRIC system since in that system the sun is revolving around the Milky Way galaxy, and this would have to be added to the 30km/sec of the Earth around the sun. Miller and Marinov were heliocentrists and thus made their calculations by triangulating them with the sun's movement, whereas MMX-type calculations only dealt with the alleged 30km/sec the Earth would be traveling around the sun if it completes its orbit in 365.25 days and is 93 million miles away.

So there is no "wax nose" in geocentrism. There is only your misunderstanding of how it works. We don't have a sun going around the Milky Way, since it is going around the Earth only, and so is the Milky Way. The only ether drift the Earth would feel is that

which blows adjacent to its circumference, and that is 0.46km/sec, as measured by the 1925 MGX. Only if the ether drift was measured millions of miles away from Earth would it result in 200 – 300 km/sec.

DP: In answer to the question whether there is an ether, Rick said candidly on the Non Sequitur show:

R. Delano: You know, it's a very good question,...six months ago I would have unhesitatingly answered yes and then a very smart guy taught me a lesson. He asked me what it is. And, I danced around and tap danced and did the buck and win [?] for a while and I finally realized I don't know that the hell it is. And I regularly criticize scientists for talking about dark matter and dark energy as if these things had somehow been shown to exist and I felt to somewhat of a hypocrite. I don't know what the aether is.

Whether physicists eventually abandon dark matter models in preference for, say, a modified theory of gravity remains to be seen (on this see "[Dark Matter Illuminates Geocentric Double Standards](#)"). But I think we see that physicists have quite rightly abandoned the notion of a luminiferous ether because, unlike with dark matter, there's no observational evidence that it exists.

RS: I would not expect Rick to know what the ether is, and I may not know what it is either. I can only offer suggestions. Likewise, modern science does not know what causes gravity, much less can they explain why a spiral galaxy spins 10 times too fast for Newton's laws. But we see gravity in operation every day and we depend on it to work all day, everyday. In the same way, we see ether in operation in the 1925 MGX experiment as it measured 98% of the expected ether for a daily rotation, an experiment that you have not explained.

So we may not know precisely what the composition of the ether is (just like we don't know what causes gravity) but we know its results and we can measure them. And since the 1925 MGX was in a vacuum, then the ether drift measured cannot be from gaseous baryonic material. Likewise, we know why we don't see a concordant ether drift in MMX or sapphire resonators, and that is because the Earth is not moving around the sun. You want to interpret the null results of MMX and sapphire resonators as evidence for an invariant light speed, but if that were the case, then why is light speed slowed down in the 1925 MGX? You have no answer for that discrepancy, and therefore you don't include the results of the MGX into the discussion (except when you confuse the MGX with the MMX).

DP: Final Summary: My contention is that there is no coherent ether model that can make sense of the results from both MM and Sagnac interferometers.

RS: See what I mean? You deliberately leave out the 1925 MGX and mention only the 1887 MM[X] and Sagnac.

DP: Rather, taken as a whole interferometer experiments demonstrate that the ether does not exist. Therefore, by itself, failure to detect it lends no support for or against a moving Earth or a motionless Earth.

RS: We can see what David is trying to do. He is trying to confine the discussion to one of “a moving Earth or a motionless Earth,” so as to confine the issue to the 1887 MMX and avoid the 1925 MGX, which measured rotation.

In reality, if he doesn't have an answer to the 1925 MGX (which, incidentally, used the EXACT SAME ETHER DRIFT CONCEPT as MMX and therefore must be answered on the same basis), then David doesn't have an answer to anything.

And as we stated earlier, not only does he not have an answer to the 1925 MGX, he doesn't have an answer to either the 1887 MMX or the 1913 SAGX. Why? Because a geocentrist can accept a completely null result from MMX or he can accept a partial null result. Either one would mean the Earth is not revolving around the sun. So the MMX doesn't help David to prove his case, and I frankly don't know why he spends so much time on it. It only opens him up to us having to go to the MGX for a more complete analysis of the interferometer experiments, and when we go there, we find that there is a total and complete reversal of the MMX, and one that is not in David's favor, but one which destroys his whole case.

DP: But the Michelson-Morley experiment has been a major plank in the geocentric apologia.

RS: Yes, it is a major plank, but the 1925 MGX is also a major plank. Without BOTH of them being analyzed, any interpretation given to MMX without the results of MGX will either be wrong or suspect. The whole picture has to be taken into account. As noted earlier, the fact that MMX is a “major plank” was stated well by Einstein's biographer, Ronald Clark, who, after the null results of MMX were spread around the world, everyone realized that there were three choices, and one of them was this one:

The problem which now faced science was considerable. For there seemed to be only three alternatives. The first was that the Earth was standing still, which meant scuttling the whole Copernican theory and was unthinkable.¹¹

So, if they firmly believed, like David apparently does, that the Earth MUST move around the sun (since they think Newton proved it by claiming that the smaller MUST revolve around the larger), then they will devise a system of physics that allows it. Practically speaking, they have no choice, otherwise they would have to bow to the Catholic popes who condemned Galileo. So this is what Lorentz and Einstein set out to do—to show the popes were wrong, despite the fact that the new scientific evidence showed the Earth isn't moving.

How did they do it? Instead of making Earth constant, they opted to make light constant (in spite of the fact that the Bible says the Earth is constant and never says that light speed is constant). One or the other has to budge. If you make the Earth constant, then light speed has to vary. If you make light constant, then Earth has to move. There is no middle position.

So, all they needed to advertise to the world was that light speed is constant and could never decrease or increase, thus what we thought we were seeing in the MMX experiment was not really true. It was actually the other way around—light was constant and Earth was moving.

But then they ran into some problems. When they made light constant, the physics forced them to say that material objects shrink when they move, and that time itself changes, and that the mass of the object must increase.

They also had to say that one of two twins will age faster when one goes off in a rocket ship (even though, to this very day, they can't prove which one of the twins will age faster due to the "relative" nature of movement); and they will have to dispense with ether to keep light constant,¹² (and, in turn, sacrifice all the good things the ether did for them when understanding the effects of electricity, magnetism and light);¹³ and they will

¹¹ *Einstein: The Life and Times*, 1984, pp. 109-110.

¹² Einstein stated: "The introduction of a 'light ether' will prove to be superfluous, because the view here to be developed will introduce neither a 'space at absolute rest' provided with special properties, nor assign a velocity vector to a point of empty space in which electro-magnetic processes take place" ("Zur Elektrodynamik bewegter Körper," *Annalen der Physik*, 4th series, 17, Sept. 26, 1905).

¹³ "In the United States Albert Michelson and Edward Morley had performed an experiment which confronted scientists with an appalling choice. Designed to show the existence of the ether...it had yielded a null result, leaving science with the alternatives of tossing aside the key which had helped to explain the phenomena of electricity, magnetism, and light or of deciding that the earth was not in fact moving at all." (*Einstein: The Life and Times*, 1984, p. 57); "The Michelson-Morley experiment confronted scientists with an embarrassing alternative. On the one hand they could scrap the ether theory which had explained so many things about electricity, magnetism, and light. Or if they insisted on retaining the ether they had to abandon the still more venerable Copernican theory that the

need to confine the speed of gravity to light speed (since, as they claim, “nothing can go faster than light”; but then they will need to compensate for the slow speed of light and thus create an “inflation” after the Big Bang, since if it exploded at the speed of light, nothing would ever be formed in the universe); and they will have to ignore the redshift that puts the Earth in the center and instead claim that everything is on the surface of a balloon, but then they will have problems with the speed of the expansion and need to go beyond the speed limit of light (i.e., the opposite of the limited speed of light that made them invent “inflation” in the first place) and claim that the universe is expanding at four times faster than the limit they gave to light speed originally!

We aren’t done with this Rube Goldberg yet. They then discover that all of their above talk about having the speed of light constant (so that they could then say the Earth is moving), is only true in one particular place of the universe, namely, an “inertial frame.” An inertial frame is one in which there is a vacuum and there is no gravity and no inertial forces. Why? Because light speed will change whenever gravity or inertial forces are present. Needless to say, this “inertial frame” must be a very special and unique place. In fact, it is so unique, I know of no place in the universe in which there is no gravity or inertial forces. So, in point of fact, for all their desperation to replace the non-moving Earth with a constant speed of light, there really was no *bona fide* place they could apply it.

What to do? What to do?

So this caused Einstein to rethink the whole endeavor. Ten years later (1915) he came up with a better theory and called it the General Theory of Relativity. This theory began to untie some of the knots into which the Special Theory got them in 1905. For example, Einstein realized that there is no special place in the universe that we can call an “inertial frame,” since every place is affected by gravity. He writes:

“There can be no space nor any part of space without gravitational potentials; for these confer upon space its metrical qualities, without which it cannot be imagined at all. The existence of the gravitational field is inseparably bound up with the existence of space.”¹⁴

earth is in motion. To many physicists it seemed almost easier to believe that the earth stood still than that waves – light waves, electromagnetic waves – could exist without a medium to sustain them. It was a serious dilemma and one that split scientific thought for a quarter century. Many new hypotheses were advanced and rejected. The experiment was tried again by Morley and by others, with the same conclusion; the apparent velocity of the earth through the ether was zero.” (Lincoln Barnett, *The Universe and Dr. Einstein*, p. 44).

¹⁴ May 5, 1920 address delivered to the University of Leyden titled “Ether and the Theory of Relativity,” http://en.wikisource.org/wiki/Ether_and_the_Theory_of_Relativity.

Once that plank fell, another one fell when Einstein admitted that light speed was no longer considered constant in GRT. As we can see, once Einstein realized that he had to make his theory fit the whole universe and not just some special “inertial frame,” light became variable because everywhere it traveled it was going to run into gravity or inertial forces. Hence in 1920 Einstein finally admitted:

In the second place our result shows that, according to the general theory of relativity, the law of the constancy of the velocity of light *in vacuo*, which constitutes one of the two fundamental assumptions in the special theory of relativity and to which we have already frequently referred, cannot claim any unlimited validity. A curvature of rays of light can only take place when the velocity of propagation of light varies with position. Now we might think that as a consequence of this, the special theory of relativity and with it the whole theory of relativity would be laid in the dust. But in reality this is not the case. We can only conclude that the special theory of relativity cannot claim an unlimited domain of validity; its results hold only so long as we are able to disregard the influences of gravitational fields on the phenomena (*e.g.*, of light).¹⁵

But that’s not all. The ether that he rejected in 1905 (in consequence of his desire to say that light would be constant because it didn’t have to travel through ether), suddenly came back to be a necessity in his new General Theory. Einstein admitted this in 1916, saying:

...in 1905 I was of the opinion that it was no longer allowed to speak about the ether in physics. This opinion, however, was too radical, as we will see later when we discuss the general theory of relativity. It does remain allowed, as always, to introduce a medium filling all space and to assume that the electromagnetic fields (and matter as well) are its states...once again “empty” space appears as endowed with physical properties, *i.e.*, no longer as physically empty, as seemed to be the case according to special relativity. One can thus say that the ether is resurrected in the general theory of relativity....Since in the new theory, metric facts can no longer be separated from “true” physical facts, the concepts of “space” and “ether” merge together.¹⁶

It would have been more correct if I had limited myself, in my earlier publications, to emphasizing only the non-existence of an ether velocity, instead of arguing the total

¹⁵ Albert Einstein, *Relativity: The Special and General Theory*, 1920, p. 76; Methuen, London; Albert Einstein, *Relativity: The Special and the General Theory*, authorized translation by Robert W. Lawson, 1961, p. 85. In his first paper on General Relativity in 1912, Einstein stated: “the constancy of the velocity of light can be maintained only insofar as one restricts oneself to spatio-temporal regions of constant gravitational potential...” (Albert Einstein, 1912, *Anallen Physik* 38, 1059).

¹⁶ Albert Einstein, “Grundgedanken und Methoden der Relativitätstheorie in ihrer Entwicklung dargestellt,” *Morgan Manuscript*, EA 2070, as cited in Ludwik Kostro, *Einstein and the Ether*, Apeiron, 2000, p. 2. For a good summation of Einstein’s reasoning in regard to reviving the ether concept, see Galina Granek’s “Einstein’s Ether: Why Did Einstein Come Back to the Ether?” *Apeiron*, vol. 8, no. 3, July 2001; “Einstein’s Ether: Rotational Motion of the Earth,” *Apeiron*, vol. 8, no. 2, April 2001; Ludwik Kostro, “Einstein and the Ether,” *Electronics and Wireless World*, 94:238-239 (1988). Kostro writes: “the notion of ether was not destroyed by Einstein, as the general public believes” (*ibid.*, p. 239); “Lorentz wrote a letter to Einstein in which he maintained that the general theory of relativity admits of a stationary ether hypothesis. In reply, Einstein introduced his new non-stationary ether hypothesis” (*ibid.*, p. 238).

non-existence of the ether, for I can see that with the word *ether* we say nothing else than that space has to be viewed as a carrier of physical qualities.¹⁷

Recapitulating, we may say that according to the general theory of relativity space is endowed with physical qualities; in this sense, therefore, there exists an ether. According to the general theory of relativity space without ether is unthinkable; for in such space there not only would be no propagation of light, but also no possibility of existence for standards of space and time (measuring-rods and clocks), nor therefore any space-time intervals in the physical sense. But this ether may not be thought of as endowed with the quality characteristic of ponderable media, as consisting of parts which may be tracked through time. The idea of motion may not be applied to it.¹⁸

Notice the only difference between Lorentz's luminiferous ether of 1892 and Einstein's ether of 1920 is that Einstein doesn't want his ether to move (although he will find out later that his GRT theory will require it to move, but more on that later), but it is still a carrier of light, just as Lorentz's ether was. Einstein admits this here:

According to the general theory of relativity space without ether is unthinkable; for in such space there not only would be no propagation of light, but also no possibility of existence for standards of space and time (measuring-rods and clocks), nor therefore any space-time intervals in the physical sense.¹⁹

Second, did Einstein know what his "revived" ether was composed of? Apparently not. He said it was not "ponderable" yet "carried physical qualities." Wow! What kind of substance is this ether? It does so many things for us, but Einstein can't put his finger on what exactly it is. Now, if we were David Palm, we would be tempted at this point to say, "hey, it's not observable, so it doesn't exist," just like he did with the ether I was presenting. But obviously David does not want to do that to his mentor Einstein. But I will simply say, then, that if David tolerates Einstein's ether, he's going to have to tolerate mine.

So, to recap, Einstein took back in the General theory almost everything he eliminated in the Special theory. In GRT, we now have an Einsteinian universe that has a variable light speed and a new "luminiferous" ether. But weren't these the very things Einstein had eliminated in 1905 to explain why the 1887 MMX couldn't have been showing us that the Earth was motionless in space? You bet! So why aren't we hearing about any of this from modern academia? I'll leave that to you, at the risk of being labeled a "conspiracy theorist" if I tell you the real reason.

¹⁷ Albert Einstein, "Letter to H. A. Lorentz, November 15, 1919," EA 16, 494, as cited in Ludwik Kostro, *Einstein and the Ether*, *Aperion*, 2000, p. 2.

¹⁸ *Ibid.*

¹⁹ *Ibid.*

Be that as it may, as noted above, the other thing Einstein had to take back was his insistence that the ether couldn't move. Why? Because the General Theory requires that the universe, with its ether, be allowed to rotate around a motionless Earth. If the universe moves relative to a fixed Earth then the ether moves relative to a fixed Earth (which, by the way, is what we are measuring in the 1925 MGX). Einstein said it best here:

We need not necessarily trace the existence of these centrifugal forces back to an absolute movement of K' [Earth]; we can instead just as well trace them back to the rotational movement of the distant ponderable masses [stars] in relation to K' whereby we treat K' as 'at rest.'...

On the other hand, the following important argument speaks for the relativistic perspective. The centrifugal force that works on a body under given conditions is determined by precisely the same natural constants as the action of a gravitational field on the same body (*i.e.*, its mass), in such a way that we have no means to differentiate a 'centrifugal field' from a gravitational field....

This quite substantiates the view that we may regard the rotating system K' as at rest and the centrifugal field as a gravitational field....The kinematic equivalence of two coordinate systems, namely, is not restricted to the case in which the two systems, K [the universe] and K' [the Earth] are in uniform relative translational motion. The equivalence exists just as well from the kinematic standpoint when for example the two systems rotate relative to one another.²⁰

The high speed required for a rotating universe is also allowed by Einstein's General Relativity. A noted relativist, G. V. Rosser said it this way:

Relative to the stationary roundabout [the Earth], the distant stars would have...linear velocities exceeding 3×10^8 m/sec, the terrestrial value of the velocity of light. At first sight this appears to be a contradiction...that the velocities of all material bodies must be less than c [the speed of light]. However, the restriction $u < c = 3 \times 10^8$ m/sec is restricted to the theory of Special Relativity. According to the General theory, it is possible to choose local reference frames in which, over a limited volume of space, there is no gravitational field, and relative to such a reference frame the velocity of light is equal to c

If gravitational fields are present the velocities of either material bodies or of light can assume *any numerical value* depending on the strength of the gravitational field. If one considers the rotating roundabout as being at rest, the centrifugal gravitational field assumes enormous values at large distances, and it is consistent with the theory of

²⁰ Einstein's October 1914 paper titled: "Die formale Grundlage der allgemeinen Relativitätstheorie," trans. by Carl Hofer, in *Mach's Principle: From Newton's Bucket to Quantum Gravity*, eds. Julian Barbour and Herbert Pfister, pp. 69, 71.

General Relativity for the velocities of distant bodies to exceed 3×10^8 m/sec under these conditions.²¹

Unfortunately, you won't get any of this important information from David. He'll just tell you that I'm not allowed to use Einstein to support geocentrism because I am opposed to Einstein's theory. I may be opposed to Einstein's theory but: (1) David isn't, and (2) I am not opposed to the "general principle of relativity," both geometric and dynamic, and that is what I use to support geocentrism.

DP: The too-low readings from the MMX and Miller experiments in particular have been emphasized again and again by geocentrists as a failure of "heliocentrism" and thus as evidence for a motionless Earth.

RS: We really don't need MMX and Miller any longer, now that the sapphire resonators, which are constructed on the blueprint of the MMX, have clearly shown the expected null result the geocentrist needs for a non-moving Earth. Again, all David's attempts to interpret either the MMX or the resonators as "proof" of the invariance of light speed is all denied by the results of the 1925 MGX, not to mention again that Einstein himself superseded his Special relativity with his General relativity.

DP: In addition, GWW and other geocentric presentations have repeatedly ridiculed modern scientists for supposedly using the Lorentz contraction to explain MMX.

RS: Apparently, David thinks that just by reasserting what we do, you are supposed to look askance at it, as if there is something wrong with ridiculing a theory, with absolutely no proof whatsoever, that magically changes lengths, magically changes time itself, and magically adds mass to an object.

Moreover, the motivation of Einstein to invent the contraction theory wasn't because someone discovered some factual evidence how the world works; rather, it was an anti-discovery, without any factual evidence. It was pieced together with the sole purpose of wanting to keep the Earth moving, otherwise the whole science community would need to start a novena to Pope Paul V and Urban VIII for condemning Galileo. As Einstein's biographer put it, "it was unthinkable" to consider the Earth was motionless in space. But since they couldn't find a reason that it couldn't be motionless, they invented the "ridiculous" theory of length contraction.

²¹ *An Introduction to the Theory of Relativity*, William Geraint Vaughn Rosser, 1964, p. 460. Rosser was the senior lecturer in Physics at Exeter University.

But now that David thinks he has exposed the MMX as “bogus,” I wonder what he is going to do with the Special Relativity theory that was based on that “bogus” experiment. Wouldn’t a bogus MMX make SRT bogus as well?

DP: A more reasonable and parsimonious explanation is that Einstein’s postulates (particularly the second, in this case) explain the early ether drift experiments, the MMX, Kennedy-Thorndike, more modern interferometer experiments, and a host of additional observations,

RS: Observe how David makes it sound like Einstein’s light speed postulate has never changed in GRT. Like I said, you will never get the other side of the story from David. I always give both sides of the story, and then I tell you why which one is the correct one. And, of course, as long as David keeps ignoring the 1925 MGX, he will never really understand what actually happened in the 1887 MMX or even the 2018 sapphire resonators.

DP: while at the same time *eliminating any need to posit existence of a luminiferous/electropon ether.*

RS: Oh well, since there is no need for ether in David’s world, he just threw out Einstein’s “luminiferous” ether that Einstein said was the “carrier” of light.

DP: And contrary to the claims of GWW, Special Relativity has so far passed all of the rigorous tests thrown at it (again, see e.g. Roberts’ page linked above.)

RS: Is that so? Is that why Einstein had to admit that it was no longer applicable when he stated:

According to the general theory of relativity space without ether is unthinkable; for in such space there not only would be no propagation of light, but also no possibility of existence for standards of space and time (measuring-rods and clocks), nor therefore any space-time intervals in the physical sense.²²

DP: In sum, I think the GWW ether model is flawed in a number of ways and the whole geocentric argument from the Michelson-Morley experiment should be retracted as unsustainable.

RS: Again, we don’t need the MMX to prove our case. We use it only to establish how Einstein, who at that time thought that the MMX made the Earth standstill, used that evidence to give an alternate reason for the results of the MMX.

²² Ibid.

And, of course, no one in academia is claiming that the 1925 MGX is bogus, including Thomas Roberts. That experiment, verified by ring lasers, shows there is a daily relative rotation between Earth and space, and it was based on ether, and that is the only ether that the geocentrists claims exists.

Finally, allow me to site the evidence from modern science that many scientists have begun to accept back the very ether Einstein denied them in 1905 (and which he later took back in 1915). One Nobel laureate in physics who has spent his life studying what constitutes space put it this way:

It is ironic that Einstein's most creative work, the general theory of relativity, should boil down to conceptualizing space as a medium when his original premise was that no such medium existed.... Einstein... utterly rejected the idea of ether and inferred from its nonexistence that the equations of electromagnetism had to be relative. But this same thought process led in the end to the very ether he had first rejected, albeit one with some special properties that ordinary elastic matter does not have. The word "ether" has extremely negative connotations in theoretical physics because of its past association with opposition to relativity. This is unfortunate because, stripped of these connotations, it rather nicely captures the way most physicists actually think about the vacuum.

In the early days of relativity the conviction that light must be waves of something ran so strong that Einstein was widely dismissed. Even when Michelson and Morley demonstrated that the earth's orbital motion through the ether could not be detected, opponents argued that the earth must be dragging an envelope of ether along with it because relativity was lunacy and could not possibly be right.... Relativity actually says nothing about the existence or nonexistence of matter pervading the universe, only that such matter must have relativistic symmetry.

It turns out that such matter exists. About the time relativity was becoming accepted, studies of radioactivity began showing that the empty vacuum of space had spectroscopic structure similar to that of ordinary quantum solids and fluids. Subsequent studies with large particle accelerators have now led us to understand that space is more like a piece of window glass than ideal Newtonian emptiness. It is filled with "stuff" that is normally transparent but can be made visible by hitting it sufficiently hard to knock out a part. The modern concept of the vacuum of space, confirmed every day by experiment, is a relativistic ether. But we do not call it this because it is taboo.²³

²³ Robert B. Laughlin, *A Different Universe: Reinventing Physics from the Bottom Down*, 2005, pp. 120-121. The two chapters of Laughlin's book that deal with these issues are: "The Nuclear Family," (pp. 99-116 and "The Fabric of Space-Time" (pp. 117-126). Laughlin can speak so boldly about ether and not be afraid of suffering chastisement because, as one author notes: "...the impression of suggesting an ether theory is carefully avoided, because such can still be career suicide. Only physicists who were established beyond reproach could discuss ether-like aspects

Of course, the “window glass” is just an analogy, since space must be far finer and discrete than glass. Modern physics is giving us a scientific clue and a logical conclusion that space cannot be a “nothing”; and that the “something” it is acts like a solid, a liquid, a gas, or a plasma when various sophisticated instruments are used to test its composition. For example, modern science has theorized the existence of an indivisible and invisible substance with extreme granularity, which exists in what are called the “Planck dimensions.” Here the smallest particle is an extremely “flexible” 10^{-35} meters in dimension (*i.e.*, 20 orders of magnitude smaller than the electron at 10^{-15} meters) but also a “hard” substance of 10^{94} g/cm³ (*i.e.*, so hard that a teaspoonful would weigh more than thousands of the universe). These numbers are derived by using other known constants such as gravity, the speed of light, *etc.* As Craig Hogan of Fermilab put it, “The planck scale is not just small—it is the smallest.”²⁴ Many other scientists have reasoned to the same conclusion. George Musser writes:

The point is just that the space we observe could be a product of some underlying structure. When we walk across a room, we are not gliding passively through a preexisting expanse. Something is happening. There is machinery at work, a grinding of gears deep within nature, to produce the experience of being “here” and being “there.”²⁵

From his book, *Einstein and the Ether*, Ludwik Kostro also comments on Albert Einstein’s final recognition in 1920 that space is made of a fine and discrete substance, which he called “ether”:

Modern science has its roots in ancient Greek philosophy. This philosophy, as we know, used the word “ether” to designate the particular kind of matter that filled the universe. This term was used throughout the history of philosophy and science, and it was also current at the beginning of this century. A resumption of its use at the dawn of this new century is now a fact. Since, according to the General Theory of Relativity and other modern branches of physics, the space and time of the universe do not constitute a vacuum, but a structured material plenum characterized by different physical quantities, the historical and traditional word “ether” is the most appropriate to express these features of the universe.²⁶

Even Isaac Newton believed in the ether. Although in his famous book *Principia Mathematica* he said, “I design only to give mathematical notions of these forces, without consideration of their physical causes and seats,” which led to his concept of “action-at-a-distance” whereby gravity was mysteriously transported over vast distances

openly, like George Chapline, Gerd ’t Hooft, Robert Laughlin, or Frank Wilczek, just to alphabetically list a few who did. Today, we finally witness the dams breaking and ever more people dare to ‘come out.’” Sascha Vongehr, “Supporting Abstract Relational Space-Time as Fundamental without Doctrinism Against Emergence,” Nanjing University, China, Dec. 2009, p. 2.

²⁴ See *Scientific American*, Feb. 2012, pp. 32-6; arXiv:1002.4880v27, Feb 2012.

²⁵ *Spooky Action at a Distance*, George Musser, 2015, pp. 160-170.

²⁶ Ludwik Kostro, *Einstein and the Ether*, 2000, pp. 186-187.

by some mysterious yet unexplained means, nevertheless, he believed that space was filled with something. He writes:

May not planets and comets, and all gross bodies, perform their motions more freely, and with less resistance in this aethereal medium than in any fluid, which fills all space adequately without leaving any pores, and by consequence is much denser than quick-silver and gold? And may not its resistance be so small, as to be inconsiderable? For instance; if this aether (for so I will call it) should be supposed 700,000 times more elastick than our air, and above 700,000 times more rare; its resistance would be above 600,000,000 times less than that of water. And so small a resistance would scarce make any sensible alteration in the motions of the planets in ten thousand years.²⁷

Others after him held closely to this conviction, since it explained so many other phenomena in nature. As Robert Hooke understood it:

The mass of æther is all æther, but the mass of gold, which we conceive, is not all gold; but there is an intermixture, and that vastly more than is commonly supposed, of æther with it; so that vacuity, as it is commonly thought, or erroneously supposed, is a more dense body than the gold as gold. But if we consider the whole content of the one with that of the other, within the same or equal quantity of expanation, then they are both equally containing the material or body.²⁸

James Clerk Maxwell's entire electromagnetic theory was built on the foundation of ether, and he held the same idea as Newton regarding the constitution of interplanetary space. He writes:

Ether or Æther (αἰθήρ probably from αἶθω, "I burn") a material substance of a more subtle kind than visible bodies, supposed to exist in those parts of space which are apparently empty.... Whatever difficulties we may have in forming a consistent idea of the constitution of the aether, there can be no doubt that the interplanetary and interstellar spaces are not empty, but are occupied by a material substance or body, which is certainly the largest, and probably the most uniform body of which we have any knowledge. Whether this vast homogeneous expanse of isotropic matter is fitted not only to be a medium of physical interaction between distant bodies, and to fulfill other physical functions of which, perhaps, we have as yet no conception, but also...to constitute the material organism of beings exercising functions of life and mind as high or higher than ours are at present – is a question far transcending the limits of physical speculation.²⁹

²⁷ Isaac Newton, *Opticks*, Fourth edition, 1730, Question 22. Newton addresses the issue of ether from Questions 18-31, mostly in reference to the travel of light through ether.

²⁸ *From the Posthumous Works of Robert Hooke*, 1705, pp. 171-172, cited in O. Lodge, *The Ether of Space*, p. 98.

²⁹ *Encyclopedia Britannica*, 9th edition, Edinburgh: Adam and Charles Black, 1875, under the title "Ether," republished by Cambridge University Press, 1890. Expanding on Maxwell's Greek, the word αἰθήρ commonly referred to the upper, purer air, as opposed to ἀήρ, the lower air or atmosphere. This distinction would make the ether the rarified interplanetary medium in distinction to the air near the Earth. Although αἶρω may be the closest

The vast interplanetary and interstellar regions will no longer be regarded as waste places in the universe, which the Creator has not seen fit to fill with the symbols of the manifold order of His kingdom. We shall find them to be already full of this wonderful medium; so full, that no human power can remove it from the smallest portion of space, or produce the slightest flaw in its infinite continuity. It extends unbroken from star to star; and when a molecule of hydrogen vibrates in the dog-star, the medium receives the impulses of these vibrations, and after carrying them in its immense bosom for several years, delivers them, in due course, regular order, and full tale, into the spectroscope of Mr. Huggins, at Tulse Hill.³⁰

Robert Moon tells us that space even contains electrical resistance:

According to accepted theory, free space is a vacuum. If this is so, how can it exhibit impedance? But it does. The answer, of course, is that there is no such thing as a vacuum, and what we call free space has structure. The impedance equals 376+ ohms.³¹

Steven Weinberg notes in a 1989 paper that the energy density of space is upwards and probably beyond 10^{71} GeV, which is close to the Planck density. Alan Kostelecký adds:

Whatever the eventual form of the ultimate theory, quantum physics and gravity are expected to become inextricably intertwined at a fundamental length scale of about 10^{-35} meters, which is called the Planck length, after the 19th century German physicist Max Planck.³²

As we see, modern science is well on its way to confirming the fact that space is not only not a “nothing,” but a functioning and formidable “something,” and a something that far exceeds our imagination and expectations, which is precisely what we would expect from God who also makes things as intricate as the human cell, which is a veritable city confined within a hundredth of a centimeter, and He creates things as microscopic but as complex as deoxyribonucleic acid (DNA). No wonder Psalm 150:1 calls this “something,” “God’s mighty firmament.”³³

derivative, it was a separate word found only in the present and imperfect tense, ἦθον, meaning “to light or kindle,” and rarely “to burn or blaze.” Another significant derivative is αἶθων, the participle of αἶθω, which either means “fiery burning” or “flashing or glittering metal” (Liddell and Scott, *Greek-English Lexicon*, Oxford University Press, 1871, 1977, pp. 18-19). The “metal” aspect of ether has some representation in the Hebrew word עֲרֵבַר translated as “firmament” in Genesis 1:6-9, since the Hebrew refers, among other meanings, to a beaten down metal, denoting firmness.

³⁰ *Encyclopedia Britannica*, 9th edition, Edinburgh: Adam and Charles Black, 1875, under the title “Ether,” republished by Cambridge University Press, 1890, as cited in Sir Oliver Lodge, *The Ether of Space*, 1909, p. 114.

³¹ “Space Must Be Quantized,” *21st Century*, May-June, 1988, p. 26ff.

³² *Ibid.*

³³ See my book, *A Googolplex of Tiny Blackholes: A Theory of Gravity, Inertia and the Speed of Light*, 2017, CAI Publishing, Inc, for more information on the firmament and the structure of space. Available at www.academia.edu/