Re: The speed of gravity revisited

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[This replies to Koobee Wublee, Albertito, Mike, and Tom Roberts.]

Koobee Wublee writes:

> [TomVF]: this clock−slowing effect is just like the slowing a pendulum clock experiences when the temperature increases: the clock slows, but nothing happens to real time as used to measure change in the universe at large. So in LR, there is no time dilation, only clock−slowing. The clocks in the local gravitational potential field are "standards", and clocks with a relative motion run slow relative to the standards.

> [Wublee]: Your LR does not satisfy the principle of relativity. Your clock slowing but no time dilation is spooky.

Actually, LR does satisfy the principle of relativity. Even though the local gravitational potential field is a preferred frame locally, one cannot use it to define a universal preferred frame. So all motion is still only relative motion.

"Spooky" is a rather subjective description. Do you consider pendulum clocks "spooky" because they slow down with a temperature increase? How is the natural slowing of an atomic clock immersed in a denser local gravitational potential field any different in principle? Don't all waves slow down when propagating in a denser medium?

> [Wublee]: Apparently, you have not thought out all the mechanisms that can cause a perfectly working clock to slow down.

Suppose we built a clock that ticked off one microsecond every time a sound wave in its chamber was sent to a deflector and returned. If we then placed that clock in a denser atmosphere, it would slow its rate of ticking.

This is a good analogy for what happens to the oscillating electromagnetic signals in an atomic clock when it is in a stronger gravitational potential field, as for example when it is near a mass. Lots of people have given lots of thought to the mechanisms that change clock rates in potential fields, and this remains the best idea on

the table.

> [TomVF]: [SR] is an internally consistent model of nature that might have been right.

> [Wublee]: This is nonsense. SR manifests the twin's paradox.

I gave you a reference explaining how to resolve the twin's paradox in SR. You simply need to abandon your intuitive notion that distant time is unique for all frames. In SR, there is no remote simultaneity. The time right here, right now in Tokyo depends on our state of motion, and will be different for different observers.

Read Ref.[1], unless you really are not interested in understanding SR the way the relativists do. But if not, you will never succeed in communicating with them.

> [Wublee]: OK, what is the reason that Einstein thought black holes are not possible?

Einstein's 1939 paper (see Ref. [2]) showed that during collapse, entities of a collection of bodies with non−zero angular momentum would be forced to exceed the speed of light, which is impossible in SR. Therefore, he concluded, singularities ("black holes") are impossible in GR.

> [TomVF]: There is only one legitimate physical meaning of "spacetime" in GR, and it has nothing to do with space. In brief, it means proper time multiplied by c to express it in space−like units. See Ref. [3].

> [Wublee]: There is no such physical quantity as spacetime. Spacetime is merely a mathematical creation. It is a 4−dimensional expansion to how

Riemann described curved space.

All efforts to develop a theory around curved space failed, as Misner, Thorne and Wheeler remind us on p. 32 of "Gravitation".

Please read the references I cite as justification. If you just respond with declarations unbacked by observation, experiment, reasoning, or citation, your views can't communicate well to me or to others.

> [Wublee]: I thought you are quite intelligent after correcting professor Carlip's error on the aberration of gravity, but now I do not think so.

Commenting on the intelligence of others is rude. Assuming that you are smart enough to be the judge of who is "intelligent" and who is not is egotistical. Learn to "show off" by sticking to the subject and coming up with

better arguments where you can, and by conceding points where that is merited.

> [Wublee]: By the way, were you that engineer who showed the physicists that by solving four equations with four unknowns, you can retrieve altitude, latitude, longitude, and time information from four GPS satellites?

No. I worked with the Air Force data taken continuously at the Monitor Stations around the globe (having known locations), with atomic clocks at both ends (satellite and ground). GPS receivers are good for determining ground locations, but not for studying relativity or clock behavior. The raw pseudo−ranges and Doppler data are excellent for such studies. A description of the Monitor Station data and what can be done with it appears in Ref. [4].

> [Wublee]: With four acquisitions instead of original proposal of three, there is no more need to have time flow of the satellites to synchronize with the ground.

Conclusions drawn from receiver data are worthless for relativity purposes. You need to read up on GPS data analysis if you wish to make informed statements about that subject.

and Albertito writes:

> [TomVF]: What is your justification for allowing action at a distance as an explanation for any real, physical process? Do you propose to allow miracles, or can you describe a way (that no one else can) for one body to act on another without something passing between them? Think about it.

> [Albertito]: Miracle is a relative concept. If you switch on a light bulb, an uneducated neanderthal specimen would exclaim "oh, miracle!"

Many words have multiple meanings. In a physics context, miracle means "an act of God". That is the meaning I intended in my use of the word in this physics context.

> [Albertito]: The laws of nature that you 'know' might be insufficient to explain certain kind of phenomena, so you would consider those phenomena as miracles.

The "laws" of physics are derived from observation and experiment, and are always subject to revision, falsification, or replacement. By contrast, the "principles of physics" such as the causality principle are derived from logic alone, and are therefore immutable. See Ref. [5]. The only alternative to a principle of physics is a miracle in the strict sense defined above. For example, one principle is "no creation ex nihilo". The only alternative is to allow creation from nothing, which is a miracle by definition because it requires an act of God.

and Mike writes:

> [Mike]: The problem is you cannot define miracles apart from laws of physics. If your definition of a miracle is an event that violates the laws of physics then nothing along these lines has been observed so far.

See the definition of "miracle" in my answer to Albertito above. Note the distinction between *laws* and *principles* of physics.

> [Mike]: you must first show the connection of your system of logic to physical reality. This is what Aristotle called Metaphysics. Causality for example, is not physics but metaphysics.

No understanding can come from labels without crisp, clear definitions. If you read Ref. [5], this whole discussion will make more physical sense.

> [TomVF]: ** Causality: Every effect has an antecedent, proximate cause. ** Creation: No creation ex nihilo; and no demise ad nihil.

> [Mike]: I do not see how these arise from logic, actually from any system of logic. These are postulates, or better a priori axioms.

They are inviolate principles because the only alternative is a miracle (act of God). See the reference.

> [Mike]: First, to start with, there is no such thing as a "force" as an entity. Nobody has ever seen one. To get a force on a target body, you must have an agent to deliver it.

Without crisp, clear definitions, communication is hopeless. "Force" in physics is defined as the time rate of change of (3−space) momentum. Because new momentum cannot arise ex nihilo, that demands an agent to deliver it, as you say. Visibility is irrelevant. Have you ever seen a neutrino? Do you think we will never invent better instrumentation for observing the quantum world?

> [Mike]: You can forget about forces. All you have is material bodies converting work to kinetic energy.

The field of dynamics is built around momentum exchanges, which are more fundamental and useful than energy. By contrast, energy is usually the mathematical fiction. How much energy your body contains depends on whether we measure relative to the ground, or the Sun, or the Galaxy. So there cannot be anything

real or physical about the energy content of your body.

By contrast, momentum is just the product of mass (a measure of substance) and velocity (a measure of relative motion). The momentum transferred by a carrier to a target body is always unambiguous and the same for all observers in all frames.

> [Mike]: that axiom [of causality] may violate in turn how physical reality

works, you do not know that.

Given any dichotomous choice between two possibilities, one of which requires a miracle and the other does not, we are obligated to choose the latter. Allowing miracles into physics ends inquiry because there is no way to understand, explain, or predict acts of God.

> [TomVF]: Many of us have had the pleasure of discovering what gravity is physically during the past decade. See 20−author Ref. [6] for the latest research results. In a nutshell, the apple falls from the tree because there is a net graviton wind blowing down toward Earth because Earth blocks part of the graviton wind coming up from below. The fact that this elegant, intuitive picture also gives all the GR effects too is simply a delight.

> [Mike]: In order for such naive concept to work, the ration u/v, where u is the speed of an orbiting body and v the speed of the graviton must be very small to avoid drag due to the graviton wind. This leads to FTL speeds for the graviton. Regardless, the collisions would mean instant evaporation of the earth if such particles were hitting it all the time. At least, no existence of surface water due to heat generation.

All these problems were solved in Ref. [6]. See especially the chapter by Slabinski that directly calculates the drag and heat in the proposed model and finds no problems remaining. Le Sage gravitons are not only FTL, but about a million times smaller than typical quantum particles, and less detectable than neutrinos (which also can fly through the Earth with only a low probability of hitting anything). Are you avoiding the reference because you have no wish to read about recent developments by many authors on this subject? Dismissing ideas prematurely is what mainstream relativists have done. You are too good a thinker to make the same mistake.

and Tom Roberts writes:

> [Roberts]: ** No theory of physics expressed in terms of differential equations has your NAIVE "causality". Such equations describe correlations, but correlation is not causation.

I'm talking physics and logic, you are talking mathematics and philosophy. In physical reality, an uncaused effect is a miracle; and the field of "deep reality physics" is about explaining nature without miracles. So far, that remains possible in all known cases; so it must logically be preferred because a miracle in any step ends

inquiry, understanding, and predictability −− the goals of science. Causality itself arises from logic, not from mathematics or philosophy.

The role of equations in physics is to aid in predictability. Equations generally ignore constraints such as the principles of physics (e.g., the causality principle), and are therefore often incomplete and limited in their range of applicability. Observations often lead to better physical theories requiring improvements in equations.

Relativistic 3−space equations of motion describe causation, not correlation, because they are equations for the forces between masses and the accelerations of bodies in 3−space induced by those forces. However, I appreciate from your past remarks that you are unfamiliar with the fields of dynamics and celestial mechanics, and therefore may also be unfamiliar with 3−space causation.

> [Roberts]: ** quantum field theory most definitely has what you call "creation ex nihlo" and "demise ad nihil".

Here, you appear unfamiliar with the meaning of these principles, which are fundamental and therefore much discussed in many fields. I recommend a look at Ref. [5] so you better understand what these mean, and why they exist. All forms in the universe are finite in duration. They were formed from other substances at some point in time, persist for a while, then demise or explode back into other forms of substance. So in that sense, forms are always being "created" and "destroyed". However, the essence of material, tangible forms can neither be created from nothing, nor can it demise into nothing. And this is something we learn from logic, not observation. Either condition would be a miracle by definition. And that is the meaning of "created" and "destroyed" in the two principles I cited.

So when particles appear from the vacuum, that is merely a limitation of our ability to see the constituents in the vacuum that they came from, not a violation of the logical principle. The unseen constituents are, of course, what vacuum energy is all about.

Logic cannot be falsified by observation, but only by finding a fallacy in the syllogism, such as an invalid premise. The only premise for the principles of physics is "no miracles allowed".

> [Roberts]: Those do not come from "logic alone", they come from your PERSONAL HOPES AND PREJUDICES. Philosophers, mathematicians, and scientists all know how completely inadequate those statements are. You need to educate yourself, in the very areas you claim "expertise".

When you have more experience, you will discover that you cannot be convincing by making bold claims and using capital letters to back them up. My ideas are in print, peer−reviewed, and published; and many good minds have read them. Occasionally, someone (like "Mike" in this thread) will take issue with the principles for some stated cause. When that happens, we can discuss and debate those points and all can see where the merits lie.

But you offer nothing for discussion, just exaggerated claims. Where are your observations, experiments, reasoning, or citations?

> [TomVF]: I agree SR is wrong, but only because it was recently falsified by experiment.

> [Roberts]: Which experiment is that? Reference, please.

I referred to the six "speed of gravity" experiments in Ref. [7]. As Vigier and I pointed out in Ref. [8], these experiments falsify SR in favor of LR because SR cannot tolerate FTL actions in forward time, whereas LR can. Both SR and LR utilize the same math, but different physics. LR passes all the same observational tests as SR, but allows FTL travel and communication in forward time, which SR claims to be impossible. −|Tom|−

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[2] A. Einstein, "Annals of Mathematics" 40:922−936 (1939).

[3] "Does space curve?", http://metaresearch.org/cosmology/gravity/spacetime.asp.

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[5] "Physics has its principles", in "Gravitation, Electromagnetism and Cosmology", K. Rudnicki, ed., C. Roy Keys Inc., Montreal, 87−101 (2001); also at http://metaresearch.org/cosmology/PhysicsHasItsPrinciples.asp.

[6] "Pushing Gravity: New Perspectives on Le Sage's Theory of Gravitation", M. Edwards, ed., Apeiron Press, Montreal (2002).

[7] "The speed of gravity − What the experiments say", T. Van Flandern, Phys.Lett.A 250, 1−11 (1998); also at http://metaresearch.org/cosmology/speed_of_gravity.asp.

[8] "Experimental Repeal of the Speed Limit for Gravitational, Electrodynamic, and Quantum Field Interactions", T. Van Flandern and J.P. Vigier, Found.Phys. 32:1031−1068 (2002). Preprint under title "The speed of gravity − Repeal of the speed limit" available at http://metaresearch.org/cosmology/gravity/speed_limit.asp.

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