

**The Myths of Special Relativity  
Can it explain anything?**

**In press, *Atlantis Rising*, #121, Jan/Feb, 2017**

Stephen E. Robbins, PhD  
Golden Willows Farms  
2750 Church Rd  
Jackson WI 53037

8/30/2016

### **The Myths of Special Relativity: Can it Explain Anything?**

The story has long been classic: Joe takes off in a rocket to a nearby star. Jeremy, his twin brother, stays on earth, happily playing solitaire. Years later, Joe returns. He looks like a young Brad Pitt. Jeremy is in a wheel chair. He has wrinkles, grey beard, and arthritis so bad he can't manipulate his card deck. Why is Joe so young? Special Relativity tells us: due to the high velocity of his rocket, Joe's time slowed, his aging processes slowed. The reality of this exotic scenario has been confirmed by experiments. Muons, moving at high velocity, live longer than muons at rest due to this time retardation. A clock carried on a jet flying around the globe is retarded relative to a clock left at the airport. Special Relativity is a triumph for physics. The scientific findings are, per history of science professor, Jimena Canales (*The Physicist and the Philosopher*), "stunning confirmation," "unambiguous proof." The theory's status is unquestioned.

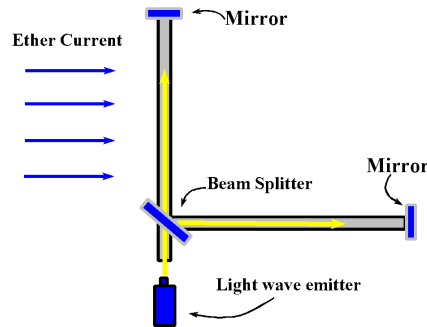
Or is this all a sham – a massive distortion, in fact, a disgrace to physics? The story of the twins is known as the "twin paradox." It is a debate that has never been settled. There are discussions yet today by respected theorists struggling with the problems it harbors. The issue is a rot at the core of physics, our theory of time, and therefore, our theory of consciousness. It was the young physicist, Paul Langevin, who announced the paradox – relativity's implication of the slower aging twin – at a conference in 1911. At this statement, up rose the antenna of one the greatest philosophers of the times, Henri Bergson – the "philosopher" in the title of Canales' book. Why? Because Langevin was now claiming that Special Relativity (henceforth, STR) can explain real, physical, or what are termed *ontological* effects – effects with actual *being* (*Greek,ontos*). When Joe returns looking like a young Brad Pitt while Jeremy has a grey beard and crippling arthritis, we have a very physical, very real, very ontological effect.

#### **Measurement Effects – Nothing More**

One might say, "So? This is what physics does – explain physical things." The problem is that the structure of STR precludes explanation of actual, physical effects. STR consists of a small set of equations, first created by Hendrik Lorentz, which transform time units and distance (space) units for a system in motion relative to another system at rest. Lorentz had proposed these to explain the results of the Michelson-Morley experiment of 1895, an experiment attempting to measure the velocity of the earth through the surrounding medium or "ether" of space. Einstein, as Bergson made explicit (*Duration and Simultaneity*, 1922), had embedded the Lorentz transformations within a *reciprocal* system, wherein each observer can declare himself at rest, the other in motion, and vice versa. This is the very essence of "relativity." No observer can precisely, unequivocally, declare himself at rest, or more precisely, each observer has the right to declare himself at rest, and all others in motion with respect to him. And vice versa! And, there's no way to tell who's correct! This is what is termed the "reciprocity" of observers. In STR, Joe the rocket-twin is equally able to declare that *he* is at rest, and his earth-twin Jeremy in motion. It is now the earth-twin that returns like Brad Pitt. Per STR then, *neither twin would age less* – the flow of time is invariant for both. For this reason, as MIT physicist A.P. French also took pains to explain in his textbook (*Special Relativity*, 1968), STR cannot be used to explain real, ontological effects, i.e., STR does not explain, and cannot be used to explain changes (of length

or of time-intervals) as "a property of matter" (p. 114); it only describes measurement effects – "something inherent in the measurement process" – effects with no ontological status.

What is meant by a "measurement" effect? I measure my toaster, happily sitting on the kitchen table, with two different rulers, one ruler half the length of the other, but both labeled "one foot." The toaster is one-foot long with the short ruler, ½ foot long with the long ruler. The toaster is 1 foot, then ½ foot, then 1 foot, etc., depending on the ruler. Is the toaster expanding/contracting? To hold this – an actual physical contraction of the toaster – would be absurd. The "effect" – expanding/contracting lengths – is a *measurement* effect only. With STR, instead of rulers, we use clocks (synchronized, or not) and light rays.



The Michelson-Morley experiment.

This measurement effects character (or "apparent" effects) was exactly why STR was considered an explanation for the Michelson-Morley experiment. At the time, the earth was conceived to be like a boat moving through the ether medium and as such we could measure the speed of the ether current as it flowed past the earthly "boat." The experimental apparatus consisted of two arms, one parallel, the other perpendicular to the ether current. Like two swimmers, one swimming across a river and back, the other swimming directly up the current and back for the same distance, two light rays were sent simultaneously through each apparatus arm, striking a mirror and bouncing back. By simple Pythagorean math, the light ray going parallel with the current should have taken longer. This did not happen. Both light rays arrived back at the same time. Either the earth was not moving through the ether, or the ether was not understood, or the experiment was faulty, or something...

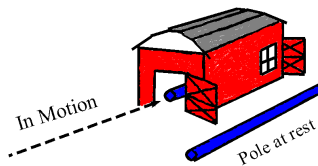
Lorentz, trying to save the Maxwell-Lorentz equations for electromagnetism and their requirement for absolute motion in the (at rest) ether, had a bit earlier offered a physical model of a contraction of the apparatus arm that lay parallel to its motion through the ether (or of any body in motion, to include a reduction of frequency). It was based on electro-dynamic forces. That is, he offered an actual, physical model of the processes involved in the contraction. With the arm parallel to the current shortened just the right amount, the light ray "swimming" in this arm could arrive back simultaneously with the ray going crosswise to the current. Per Lorentz, the contraction was a very real, a very ontological, effect. Physics rejected Lorentz's offer.

Einstein's new "relativity" offered a *measurement effects-only* solution. A stationary observer, viewing another system in motion, uses the Lorentz equations to determine the changed units of distance ( $x'$ ) and time ( $t'$ ) in the moving system. In this structure of equations, in the moving system, time units expand and, *in compensation*, space/distance units contract. Since even Michelson and Morley could not – by relativity (or reciprocity) – say they were or are at rest, the distance contraction ( $x'$ ) explained the "shortened" apparatus arm. But, intrinsic to this,

just like the twins, is the reciprocity of observers. The “contraction” could only be, and was seen as, a measurement effect. This non-ontological explanation is what physics accepted.

### Time Changes are “Special”

Physics nowadays uses the “pole-barn paradox” as a parable to reinforce this: A telephone pole, too long to fit into a barn when the pole is at rest, shrinks and fits inside when set in motion at high velocity. But, we are solemnly warned, the opposite is also true, there is that reciprocity – the barn can equally be set into motion, now the pole does not fit. Thus length (space) changes are considered not ontological; they are measurement effects only. Physics must hold this to stay consistent with its acceptance of Einstein and his supposed explanation of Michelson-Morley.



The Pole-Barn “Paradox”

But when we come to time, the story entirely changes. Not only is the twins’ differential aging considered very real, but STR is used to explain the also very real, longer life span of muons travelling at high velocity. This is assigned to “time-retardation” due to the expanded time intervals of Lorentz. In the Hafele-Keating experiment, the same explanation is applied to the retardation of a clock carried on a jet around the globe relative to its twin-clock left at the airport. These are among the “stunning confirmations” of STR. Yet, firstly, the inherent reciprocity structure precludes using STR to explain these effects. A. P. French, like Bergson earlier, noted that one could put a tiny physicist on the muon, who now declares that *he* is stationary, the earth physicist moving towards the muon. *Per STR*, neither life-span – muon or physicist – *actually* increases. Secondly, in the system of Lorentz-Einstein equations (technically, a *mathematical group*), as noted, space changes *compensate* for time changes (lengths contract as time units expand). Space and time changes then *cannot be of two different orders* – one (space) measurement only, one (time) ontological. Again, to be consistent with its structure, all effects, whether of time or space, must be taken as measurement effects, that is, as non-ontological. What has happened is that ever since Langevin, two incompatible solutions – that of Lorentz, that of Einstein – have been fused into an unholy mess. To explain these important and very real, very ontological effects – the muons, the jet-carried clocks, even (someday) the twins – some other theory, yes, *some other theory* – is necessary.

That some other theory is required to explain the longer living muons (or retarded clocks, or ageless twin), STR is invalidly used in doing so – is what Bergson could not get through to physicist Andre Metz in a back and forth argument in the journal *Revue Philosophique* in 1924 (see Gunter, *Bergson and the Evolution of Physics*, pp. 165-190). Physics, it seemed (save for Lorentz!), could conceive of no actual physical model of the slowing processes, no other explanation of the muons – despite invalidly using STR. Bergson termed it “half-relativity” – apply the Lorentz transformations to one focus, say the muon or Joe, and conveniently forget the reciprocity.

### Enter: The General Theory

In the twin paradox, the arguments often shift to invoking acceleration (since Joe's rocket must accelerate) as the cause of the aging retardation. Thus we move into the General Theory (henceforth, GTR). Einstein, in a thought experiment underpinning GTR, had imagined himself in an elevator. As it starts upwards (accelerates) one feels a "jolt." This he took to indicate that acceleration is a *force*, in fact, an equivalence to gravity (the "principle of equivalence"). Acceleration became a form of absolute – a real force. This is what has led theorists to use acceleration as the cause of the retarded aging, e.g., Paul Davies in at least two books (1977, 1995). One problem here is that there is no theoretical justification that allows one to simply import acceleration into STR, i.e., to literally destroy the theory by breaking the intrinsic reciprocity structure (where one cannot distinguish who is in motion, who at rest) by assigning acceleration to one of the systems, then simply go on and use the Lorentz equations to derive  $t'$  – the time change – as though nothing theoretically fishy has happened. Secondly, if we are assigning the real source of the explanation to GTR and acceleration, how are any of these time-related findings – the jet-carried clocks, the muons – seen as glorious verifications of STR?

Another problem strikes the heart of GTR. Bergson asked: How can acceleration possibly have such a privileged position in Einstein's framework? Velocity is the first derivative – the rate of change of position. Acceleration is simply the second derivative – the rate of change of the rate of change of position. How then can the 2nd derivative be so privileged over the 1st? If one cannot derive the Lorentz equation for  $t'$  in the context of acceleration, he argued, one has undercut all of calculus and physics itself (search "Wang, Clock Paradox" for exactly this derivation). Acceleration being involved then changes nothing in the reciprocity structure between the twins. Joe takes off and we derive his time-change via the generalized Lorentz equations for  $t'$ . Or vice versa – Jeremy, on earth, accelerates away from and back to the rocket and we compute  $t'$  for him. Neither ages more or less than the other; time flow is invariant for both.

Correlatively, since "force," in physics, is *by definition* a function of acceleration ( $f=ma$ ), force itself is fully tied to the relativity of movement – the change of position. Force itself is equally relative; it cannot have the absolute status being used to justify either the logic of GTR or the age-retardation of anything.

Others have tried to stay within the reciprocal, non-acceleration/uniform velocity-only structure of STR. Philosopher of science, Wesley Salmon, visualized rocket A leaving earth and heading to Star X. Rocket B, coming from Star X, passes A and as they pass each other, they exchange a signal as to clock readings in each. B proceeds on to earth where, upon checking A's reading, A's clock is seen to have been slowed. The problem here is that A, in his reference system, is always at rest. A's clock is not slowed. Only B (and Salmon) think A is moving. B forgot to ask A. This, however, is the fallacy Einstein likewise employs in another GTR thought experiment. He envisions person A on a rotating (acceleration therefore involved) disk. As A moves along a radius from the disk's center to the rim, Einstein states that A's clock would be increasingly retarded. But A considers himself at rest. Einstein too forgot to ask A.

### The Space-Time “Block”

The “relativity of simultaneity,” intrinsic to STR, equally lacks ontological status. Two lightning bolts strike, one to the left, one to the right of observer A, who (A thinks) is at rest. He judges them simultaneous. B, in motion towards the left, meets the light of the leftmost bolt first, the right’s arrives a bit later. He says they are not simultaneous. This is all artificial; Einstein ignored causal flows. Imagine a *very fast growing* tree. Two widely separated outward-growing branches (one left, one right) flash a light when each hits a point equidistant from the trunk. A, stationary, again says “simultaneous.” B, moving towards the left branch, says, “not.” Yet the growth of the tree is an organic, simultaneous causal flow. Its growth cannot be relativized. Arbitrary “instants” (all STR actually deals with) in this growth cannot be isolated and relativized. B is wrong, as he was about the lightning bolts, also simultaneously generated via forces within a vast storm front and a causal flow that cannot be relativized. Yet the supposed reality of the “relativity of simultaneity” engendered STR’s famous “space-time block” where all events – past, present, future – exist in an eternal, 4-D, frozen structure of “space-time.” Also myth.

STR has itself been the block – blocking progress for a century. It has not been and cannot be reconciled to quantum theory, though the “it” to reconcile – the consistent interpretation of STR or the inconsistent interpretation – is never examined. It is time for some, yes, absolute honesty.

More on Bergson/STR: *The Mists of Special Relativity: Time, Consciousness and a Deep Illusion in Physics*. Amazon.