Re: Twin Paradox is a blasphemy to Relativity

Source: http://sci.tech−archive.net/Archive/sci.physics/2005−02/3858.html

---

From: Uncle Al (*UncleAl0_at_hate.spam.net*)
Date: 02/08/05

Date: Tue, 08 Feb 2005 09:15:59 −0800

guskz@hotmail.com wrote:
>
> *First of all it is ILLEGAL to say if the brother is ACCELERATING or*
> *DECELERATING from his twin for you cannot apply a + or − vector to*
> *either one's velocity without infringing on Relativity and defining an*
> *Absolute Space.*
[snip crap]

Acceleration has nothing to do with the Twin Paradox. Idiot.

http://sheol.org/throopw/sr−twin−01.html

Don't you even suspect that cumulatively more than 100,000 physics grad students and their teachers have pondered this primitive point and reached some sort of satisfactory conclusion? GET YOUR LAZY ASS IN GEAR AND FIND IT. You are missing the big picture. You haven't even expended the minimal effort to learn it is called the Twin Paradox.

One twin travels relativistically, one twin stays at home. When they reunite the traveling twin is seen to have aged much less than his genetic double. The rule is that the one who travels more (space) is the one who ages less. The one who goes forward and then backwards travels more undeniable from any reference frame. The same is true for somebody in a circular orbit. The non−inertial reference frame ages more slowly.

The ratio by which the two have aged at the end when they are back together again is the same in all reference frames:

ratio = sqrt(t^2 − x^2 − y^2 − z^2)/t (with units of c=1)

Acceleration breaks the symmetry of who ages faster. To accomplish that, the acceleration can occur before the clocks (or the twins) exist. Only reference frames matter.

Inertial frames with relative *velocities* pursue different paths through spacetime in Special Relativity. No clock anomaly is apparent

in any of them until clocks are compared (by all being local when you do it, initial calibration then experiment). Acceleration is irrelevant in SR to the running of the clocks (as opposed to Equivalence Principle acceleration in GR). Acceleration is necessary at some arbitrary time not associated with the experiment itself for breaking the symmetry of clock observation. Acceleration defines which reference frame takes what path through spacetime − even if it occurs when the clocks are *off* (or not even constructed yet, or destroyed) − so the situation is NOT symmetric. There is a difference between the reference frame and any clocks in it.

1) Acceleration is an absolute measurement and it does not require a clock to make the measurement (e.g, simultaneous displacement of three independent orthogonally cantilevered masses). There is no doubt who was accelerated even if a clock was not running/existing during aceleration. Any past accelerated reference frame has a different mixture of space and time from an unaccelerated frame.

2) Past acceleration is irrelevant to the running of present clocks, but not to the mixture of space and time in the reference frame that said clocks measure. This is an important subtlety and the key to the whole thing. You cannot synchronize clocks except by having them local. That's what Relativity demands. If they are local at the start, you can tell who was naughty thereafter without needing a clock to do the acceleration measurement. Accelerometers are not clocks.

EXAMPLE: We have three identical clocks that are off (a state of not running, or of not even having been fabricated) and zeroed. Each clock has/will have a very short toggle jiggger switch sticking out. We load them (or their parts, or ore and a smelter and a machine shop) in individual spaceships and set up the experiment.

CLOCK 1: That's our clock. It sits stationary in our inertial reference frame with a little jigger sticking out. Touch the jigger and the "off" state becomes "on" or the "on" state becomes "off." Clock 1 is "off." Or we can build it from parts just before we need it, and in the "off" state, zeroed.

CLOCK 2: In a spaceship traveling at 0.999c relative to our inertial frame of reference. Clock 2 is "off." It was built after all acceleration ceased, and set to zero. It skims past Clock 1 (our clock), the jiggers touch, both Clocks 1 and 2 are now "on" and locally synchronized by touching. Elapsed time accumulates in each one. The situation is NOT symmetric! We have an accelerometer and they have an acelerometer. We know who accelerated to set up the experiment even if there wasn't a clock present when it happened.

CLOCK 3: In a spaceship traveling at 0.999c relative to our inertial frame of reference, but 180 degrees counter in direction to Clock 2. Clock 3 is zeroed and "off." It was built after all acceleration ceased, and set to zero.

Some arbitrary time after Clocks 1 and 2 synchronize and turn "on" by touching, Clocks 2 and 3 brush past each other, touching jiggers. Clock 2 is now "off," Clock 3 is now "on." Write down the elapsed time in now "off" Clock 2, then smash the clock with a sledgehammer. Or melt it down, or toss it over the side. The spaceship with Clock 3 is returning back over the path taken by the spaceship with Clock 2.

CLOCK 1: That's our clock. It sits stationary in our inertial reference frame with a little jigger sticking out. Clock 3 rushes past, jiggers touch. Clocks 3 and 1 are now off. All clocks are off. No clock has accelerated while "on" or even while existing. Write down elapsed times, smash each clock with a sledgehammer. Or melt them down, or toss them.

BOTTOM LINE: Get all three slips of paper together... Accelerate as you need. Or send all the results to all three folks by radio and never decelerate. All clocks have been smashed, melted, tossed. Their elapsed times were written down. The numbers on the papers won't change when you accelerate or broadcast the data.

Acceleration is arguably General Relativity, as we did setting up the experiment. It is irrelevant to the clocks. No clock is running or even exists during acceleration. Numbers written on slips of paper are unaffected by Special or General Relativity. One could as easily build the clocks from their component parts after setting up the experiment. No clock exists during acceleration up or down. The *reference frame* has accelerated in the past, and that changes its mix of space and time relative to an unaccelerated frame. The clocks are passive observers in a presently unaccelerated setting.

Finally.... compare elapsed times. Elapsed time #2=#3 (straight line motion for both traveling clocks, no acceleration!), but elapsed time #2+#3 does not equal #1, the local stationary reference frame summation. The sum of #2+#3 elasped time is only about 4.5% that than of #1's accumulated elapsed time. You have the Twin Paradox (or, Triplets) without any running clock having been accelerated − or having even existed during acceleration up or down.

--
Uncle Al
http://www.mazepath.com/uncleal/
 (Toxic URL! Unsafe for children and most mammals)
http://www.mazepath.com/uncleal/qz.pdf