

# Re: What happened between Newton and Einstein?

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  - *Date:* 1 Mar 2007 11:57:18 -0800
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On Mar 1, 10:19 am, "PD" <[TheDraperFam...@xxxxxxxxx](mailto:TheDraperFam...@xxxxxxxxx)> wrote:

I'm sorry, I don't see how absolute motion is the *\*only\** possible cause of the age differences between twins and triplets.

In the case of the twins, A and B, A and B *\*both agree\** that A takes a straighter path through spacetime than B. However, this in no way implies anything about absolute motion.

You don't see it because using twins obscures the truth. You must use triplets to clearly see what is happening.

Unlike the twin case, the triplet case contains no turnarounds and no accelerations.

This leaves only motion through space (aka absolute motion) as the physical cause of the triplets' age differences.

[kk wrote:]

Re your second claim, I reply that since Einstein's 2nd postulate is purely a mere definition (of clock synchronization), it cannot pertain to anything in nature.

I completely disagree. The second postulate is an explicit statement about what will be the result of a measurement of the speed of light,

Please describe how this "measurement" can be made.

## Re: What happened between Newton and Einstein?

There is NOTHING in the statement of the second postulate that says anything about clock synchronization.

Please describe how one can measure light's one-way speed between points A and B without using two clocks that have been "synchronized" in some way.

After you have tried to provide this description and failed, it will then dawn on you that the 2nd postulate is indeed purely a definition of clock synchronization, as Einstein said.

That is, you will then see that since it is not possible to measure light's one-way speed from point A to point B without two clocks, and you will also see that the clocks must be related in some way, you will see that someone must provide a prescription for how the clocks are to be related, and this is a definition of clock synchronization.

However, in Einstein's case, the following problem arises:

Einstein cannot really (or absolutely) synchronize clocks, and even if he could, he would not get the "answer" that he wishes to get, namely, a one-way "null result."

The only way Einstein could obtain a one-way "null result" was by forcing clocks to read  $x/c$  when a light ray traveled the frame distance  $x$ .

But this is clearly not a measurement; it is only a stipulated "result," given at the start before any measurement is made.

This is why you cannot describe the procedure for the "measurement" that you claimed can happen.

However, the postulate is not dependent on clock synchronization in any way. In fact, using light for clock synchronization is not even a \*requirement\*. You can synchronize two spatially separated clocks by \*any\* procedure that carries a signal at the same speed in both directions — including walking. Einstein just happened to use light because he had just postulated that it satisfies this criterion as a usable signal.

## Re: What happened between Newton and Einstein?

Here's Einstein's 2nd postulate:

"Any ray of light moves in the 'stationary' system of coordinates with the determined velocity  $c$ , whether the ray be emitted by a stationary or by a moving body.

Hence

velocity = light path/time interval

where time interval is to be taken in the sense of the definition in section 1."

Here's the definition from section 1:

"Let a ray of light start at the 'A time'  $T_a$  from A towards B, let it at the 'B time'  $T_b$  be reflected at B in the direction of A, and arrive again at A at the 'A time'  $T'_a$ .

In accordance with definition the two clocks synchronize if

$$T_b - T_a = T'_a - T_b "$$

No mention of walking or bullets or baseballs; only light. Also, note Einstein's use of the word "definition."

The time portion (Einstein's "time interval") of the 2nd postulate is dependent upon Einstein's definition of clock "synchronization."

Note that Einstein did not experimentally measure light's speed during any part of the 2nd postulate.

In fact, no one has ever measured light's speed from point A to point B.

Einstein merely stipulated that the clocks must read equal travel times. That is, they were forced by Einstein to read equal travel times, so they did not get this result experimentally.

This means that the 2nd postulate really has nothing to do with physics – it is merely a definition. It says nothing at all about any thing in nature. It merely reflects Einstein's belief that we will never be able to detect absolute motion. It is a mere artificial null result, given entirely by man.

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In fact, it is impossible to experimentally obtain a null result in the one-way case.

("one-way case" here means "the direct and simple measurement of light's one-way speed between two points without using clocks that have been transported or rotated because such clocks run slow.")

[kk wrote:]

Real clock slowing and real rod shrinkage entered SR not via Einstein's postulates, but via his upfront (pre-postulation-era) acceptance of the Michelson-Morley experiment null result. (Actually, Einstein simply accepted upfront full round-trip nullness, which included both the MMx and the KTx, with the former having rod contraction, and the latter having clock slowing.)

Actually, if you read the histories of this, Einstein was pretty steadfast in being unaware of the MMX result. However, he was *\*quite\** aware of the form of Maxwell's equations, and he was *\*very\** aware of that factor of  $c$  that appeared everywhere in them, and he was *\*painfully\** aware that no absolute speed appears anywhere in any of the Newtonian laws of motion and that this fact ensures their invariance with choice of inertial reference frame. And so he simply tried to figure out how it is possible that  $c$  could appear in Maxwell's equations and still have those equations be invariant with choice of inertial reference frame. It was Maxwell's equations that demanded the invariance of  $c$ , not the MMX.

I have read the history, and here it is:

[From the 1905 relativity paper]

"In agreement with experience we further assume the quantity  $2AB/(t'a-ta) = c$  to be a universal constant -- the velocity of light in empty space."

Einstein's "in agreement with experience" means "in agreement with experiment." And the only experiment that said "round-trip invariance and isotropy" was the Michelson-Morley experiment. (footnote: actually, the MMx said only isotropy; the later KTx added invariance; this is why Einstein used the word "assume"; he knew that he was talking about both isotropy and invariance.)

Maxwell did not measure light's round-trip speed.

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Nothing in Maxwell's equations tell us anything about either light's one-way or round-trip speed.

Try again.

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