Re: Motion Through Space Is Meaningful

Source: http://sci.tech−archive.net/Archive/sci.physics/2005−09/msg01078.html

- *From*: "PD" <TheDraperFamily@xxxxxxxxx>
- *Date*: 9 Sep 2005 13:10:41 −0700

2ndPostulateDude wrote:
> PD wrote:
> >A postulate is something that is *assumed without proof*.
>
> I assume that you meant "assumed to be true sans proof";
> in that case, a physical postulate is a prediction
> because it assumes to be true the outcome of some
> experiment because only experiment can supply us with
> the truth in physics.

Once again, this is simply *not true*, and you misunderstand how
physics is done.

>
> But this is not the end of your problems.
>
> Again, consider your definition that a postulate is
> something that is assumed (to be true) without proof.
> What could this possibly mean in the case of Einstein's
> light postulate? Have you never asked yourself this
> very important question?
>
> To save you the time, I will tell you what it means:
>
> It means simply that Einstein assumed one−way light speed
> invariance and isotropy to be true.
>
> But what does _this_ mean?
>
> It means that Einstein assumed that whenever light's one−way
> speed is experimentally measured between two clocks that the
> result must be or should be or will be invariance/isotropy.
>
> Got the picture so far?
>
> Now let's really get down to business:
>
> As Einstein himself pointed out very clearly, the _only_ way

> to obtain one−way light speed invariance/isotropy on paper is
> to manually preset the distant clock to read x/c after preset−
> ting the origin clock to read zero. In other words, the only
> way to obtain one−way invariance/isotropy on paper is via a
> definition of clock "synchronization."
>
> Clearly, a "result" beforehand does not qualify as an
> experimental result. This is known as rigging the result.

And you have it backwards on two counts.

1. His assumption of the invariance of the speed of light was based on two fundamental facts. a) Maxwell's equations, which should be true for any inertial observer (the way that all laws of physics should be true for any inertial observer) contain an implicit quantity which is *not* dependent on the motion of the observer and hence should be the same for any inertial observer; this quantity happens to be a speed. b) Any experiment conducted up to that point that sought to look for noninvariance/nonisotropy of lightspeed failed to find any, even in places where it was expected to show up, giving the experimental suggestion *prior to* special relativity that lightspeed may be invariant.

2. He did not define synchronization to make sure that isotropy of light was preserved. He asked the question, "what is the only physically sensible and reliable way to synchronize spatially separated clocks?" and he realized that the *only* way to do this was to carry information from one clock to another. So he used a signal, though any signal would suffice to do this. If you have a different and just as reliable way to synchronize spatially separated clocks, then by all means propose it and then develop the consequences from that.

>
> But Einstein had to do it via definition because there is
> no way to do it experimentally.
>
> That is, no one can experimentally measure light's one−way
> speed between two clocks without rigging the result by first
> setting the clocks to cause a prechosen result, just as did
> "Sir Albert."
>
> So Einstein's light postulate − contrary to your belief −
> cannot be "something that is assumed (to be true) without
> proof" because it is something that can never happen.

I think you meant "can never be proven". The way you have defined OWLS measurement (that is, following Einsteins clock synch procedure exactly), you are absolutely right, and this is precisely why there hasn't been a flurry of OWLS measurements. HOWEVER, if it were wrong, then a number of the other experimental predictions of SR would also fail.

>
> This is why, to this day, no one has ever used two clocks
> (which have not been transported and are not rotating) to
> measure light's one−way speed. There is no such experiment.
>
> Therefore, Einstein's light postulate is neither a prediction
> nor an "axiom" in any sense of either word.

It is not a prediction, that is correct. It is an axiom, though you
fail to understand that axiom does NOT imply "verifiable by
experiment".

>
> But PD went on re the light postulate, now calling it
> "an assumption":
> >However, no one has shown that the consequences of those
> >assumptions are incorrect, and therefore there is no
> >reason to believe that the assumptions are incorrect.
>
> The consequences of this "assumption" are:
>
> A. Relative time (asynchronous clocks)
> B. All of the consequences of using asynchronous clocks
> (such as apparent rod shrinkage, apparent clock
> slowing, etc., etc.)
>
> PD wrote:
> >Let me give you an example. In one experiment where I am
> >watching muons decay, [etc.]
>
> >Show me specifically how you know the speed through space
> >of either me or the muons in each case.
>
> I have already told you. You simple obtain a pair of
> absolutely synchronous clocks, and go from there.

Before going on, define this procedure. I want to synchronize two
clocks that are 10 m apart. How do you do that?
(I want to put them at either end of a 10 m rod, and I don't want to
risk moving them, because I don't *know* that moving them does not
affect the synchronization of the clocks.)

> Such
> clocks can tell you your speed through space, and such
> clocks can also tell you a muon's speed through space.
> If a muon is really moving (i.e., is moving through
> space) at half light speed, then it will live longer
> by a given amount of time per an unslowed clock. If
> your clocks are moving through space, then you of
> course must correct for it slowness.

>
> PD wrote:
> >This tells me nothing about how I measure the length
> >of a rod. Suppose I don't know its speed, though I can
> >see it flying by. How do I measure its length?
>
> Must I tell you every little step for every case?
> Using absolutely synchronous clocks (the only kind
> of _synchronous_ clocks), you locate (absolutely)
> simultaneously

Ah! "Simultaneously!" Now let's see if any two inertial observers will agree that two events are simultaneous. The reason why this is important is, if observer A makes the length measurement the way you've prescribed, then we'll soon see that observer B will say, "Hey, you didn't follow the procedure! You didn't measure the ends at the same time! Here, let me do it." And then when B measures the rod, then we'll soon see that A will object, "Hey, now *you* didn't follow the procedure. You're supposed to measure the ends at the same time!" "I did!" "Didn't!" "Did!" "Didn't!"
And we'll soon see that this will happen *no matter what procedure is followed* by A and B to synchronize the clocks. This being the case, we'll soon be faced with a conundrum: which observer is right, and how do we decide?

In other words, I'm about to show you that simultaneity is *not* an inherent or physical property of two events.

So let's set this up, if you're willing.
We have two observers in boxcars on trains with a little window in each car that doesn't let them see the ground, and they don't know whether they are standing still on the tracks or moving (indeed, there is no experiment they can do in the boxcar that will determine that; they only know that they are either going at constant speed or are stationary). But, through their tiny windows, they can see each other, and they both agree that the other is traveling relative to themselves lickety−split. At the very least, they know this because they can see each other flash by as they pass each other. Furthermore, they know that this relative velocity has been the same for a while, because they each know that they are going at constant speed (either zero or nonzero) judging by what goes on in their own boxcars. Shall I go on?

> the rod's end points. Then you know
> that it truly fits between the two clocks. You then
> correct for your own intrinsic ruler shrinkage, and
> you get the rod's (physical) length.
>
> >>The space−time interval has no physical meaning,
> >>so it is irrelevant to physics.
>
> >This is an assertion without basis.

> >... The interval is *experimentally* verified to be an
> >invariant quantity and therefore it is a quantity with
> >presumably physical meaning.
>
> Let's look at a time−like interval; this is of course
> really just the proper time between the two events, but
> is this the time per a physically unslowed clock? Only
> if it is is it physically meaningful, and useful, but
> can you prove that the clock is unslowed?

No, the interval is a combination of the time difference and the spatial difference between two events. This interval produces the *same number* regardless of the observers measuring the two events. This holds true whether the observer's time difference is the so−called "proper time" or not.

[snip]

PD

.

- ***Follow−Ups***:
  - ***Re: Motion Through Space Is Meaningful***
    - *From:* 2ndPostulateDude
- ***References***:
  - ***Re: Motion Through Space Is Meaningful***
    - *From:* 2ndPostulateDude
  - ***Re: Motion Through Space Is Meaningful***
    - *From:* Sam Wormley
  - ***Re: Motion Through Space Is Meaningful***
    - *From:* 2ndPostulateDude
  - ***Re: Motion Through Space Is Meaningful***
    - *From:* PD
  - ***Re: Motion Through Space Is Meaningful***
    - *From:* 2ndPostulateDude
  - ***Re: Motion Through Space Is Meaningful***
    - *From:* PD
  - ***Re: Motion Through Space Is Meaningful***
    - *From:* 2ndPostulateDude
  - ***Re: Motion Through Space Is Meaningful***
    - *From:* PD
  - ***Re: Motion Through Space Is Meaningful***
    - *From:* 2ndPostulateDude
  - ***Re: Motion Through Space Is Meaningful***
    - *From:* PD
  - ***Re: Motion Through Space Is Meaningful***
    - *From:* 2ndPostulateDude

- ***Re: Motion Through Space Is Meaningful***
  - ◊ *From:* PD
- ***Re: Motion Through Space Is Meaningful***
  - ◊ *From:* 2ndPostulateDude
- ***Re: Motion Through Space Is Meaningful***
  - ◊ *From:* PD
- ***Re: Motion Through Space Is Meaningful***
  - ◊ *From:* 2ndPostulateDude

- Prev by Date: ***Re: OT: The end of science and reason in US politics!***
- Next by Date: ***Re: A Hole through Earth?***
- Previous by thread: ***Re: Motion Through Space Is Meaningful***
- Next by thread: ***Re: Motion Through Space Is Meaningful***
- Index(es):
  - ***Date***
  - ***Thread***