

## Re: Length is not an intrinsic property of an object

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"joseph levy" <[josephlevy1@compuserve.com](mailto:josephlevy1@compuserve.com)> wrote in message  
news:ckhjev\$bal\$1@ngspool-d02.news.aol.com...

>

> *Paul Draper wrote:*

>

> *I've seen a number of threads where posters have difficulty with a  
> basic concept having to do with length. What I hope to do here is to  
> move the point of discussion from length to simultaneity, where it  
> belongs.*

>

> *Length is defined by an agreed-on procedure. It is not an innate  
> property of an object.*

This is typical of a lot of stuff you see around here – basically semantic philosophical quibbling without any real scientific content. However some respected philosopher/physicists have mentioned they view reality as 'what kicks back' – all the rest are human constructs eg concepts like length, time etc see <http://www.colorado.edu/philosophy/vstenger/Briefs/Real.htm>. Victor Stenger indeed holds the belief the other concepts are chosen specifically to ensure our laws are coordinate independent. But as to the scientific value of such musings – well that can be judged by the number of new experiments such views suggest and their confirmation – a big fat zero.

> *For an object at rest in the measurer's frame, it's easy.*

> *1. Place a precalibrated ruler alongside the object.*

> *2. Take note of the calibrated mark at one end of the object.*

> *3. Take note of the calibrated mark at the other end of the object.*

>

> *For an object moving in the measurer's frame, though, it's a bit more  
> tricky.*

> *1. Hold up a precalibrated ruler parallel to the object's motion.*

> *2. At a certain time mark,  $t_0$ , take note of the calibrated mark at one  
> end of the object.*

> *3. At the VERY SAME time mark,  $t_0$ , take note of the calibrated mark at  
> the other end of the object. Why is this last step so important? A*

> *moment's thinking will tell you that if there is a delay between 2 and*

> *3, the object will have moved, sliding along its path. Depending on*

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- > *which direction the object is going, you will end up with a number*
- > *that is either longer or shorter than the object's length measured if*
- > *it were at rest. So SIMULTANEITY is key to the definition of length of*
- > *an object, especially in a frame where the object is moving with*
- > *respect to the measurer.*
- >
- > *There is no other workable definition of length other than this*
- > *operational one.*
- >
- > *Ah, there's the rub...*
- >
- > *For once we agree that simultaneity is crucial to the DEFINITION of*
- > *length, then the real issue is that simultaneity is not something that*
- > *two measurers moving with respect to each other will agree on. The*
- > *"relativity" of length is directly attributable to the "relativity" of*
- > *simultaneity.*

But now we come to the other rub – the bit such folks who harp on about simultaneity and OWLS and other such issues in SR choose not to mention – or do not understand. SR deals with inertial frames that are by definition isotropic. A frame that is isotropic allows many reasonable definitions of simultaneity – all of them compatible with SR eg the Einstein sync procedure, slow clock transport, firing bullets from a gun – the possibilities seem endless and all lead to exactly the same conclusion – SR.

- >
- > *Now, if folks want to talk about why simultaneity is not an inherent*
- > *property of two events...*

Now if folks what to talk about how reasonable definitions of simultaneity in an inertial frame have nay problems.

Bill

- >
- > *PD*
- >
- > *Answer to Paul Draper*
- >
- > *Thank you for your clear exposition of the relation between relativity*
- > *of simultaneity and length contraction in the framework of the special*
- > *theory of relativity. It removes all the ambiguities regarding length*
- > *contraction which appears to be an observational but non real*
- > *process.*
- > *I completely agree. Now why two clocks whose time mark is  $t_0$*
- > *don't tick simultaneously? because they are not synchronous. And*
- > *why are they not synchronous ? because the synchronization procedures*
- > *are arbitrary. Contrary to what is often claimed, the methods used to*
- > *synchronize clocks are based on disputable assumptions, and this*
- > *is so, as well for the Einstein–Poincaré procedure with light signals,*
- > *as for the method of slow clock transport.*

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- > *(Note that in aether theories, length contraction is a real process and*
- > *not a simple distortion of the measurement due to arbitrary*
- > *synchronization.)*
- > *For more complete information, if this question interests you,*
- > *you can consult my article "Synchronization procedures and light*
- > *velocity" in my web site:*
- > <http://levynewphysics.com>
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