Re: GR ?

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- *Date*: Tue, 19 Jul 2005 01:36:17 GMT

Significant Zero wrote:

> Due you concur
> with the experimental facts that time and length are variant ?

Your question does not make sense. I'm going to guess that you mean that the spatial interval between a given pair of events, and the time interval between them, can be different for two different coordinate systems. If that's what you mean by "variant", then: yes.

> If so do you
> agree that to maintain the measured constancy of c locally
> their is a need
> for time and length to be changed in a proportionate manner so
> this apparent
> fact is maintained ?

No. A simple counterexample is the Lorentz tranforms of SR in which the changes are not "proportionate" −− the different synchronization of clocks in different inertial frames is an essential aspect of SR.

> Yes, dx'/dx| = dt'/dt| = \gamma (d = partial), but in
> |t |x
> general one has NEITHER constant x NOR constant t.

And it's not really appropriate to use the word "changed" here −− this is merely a geometric projection of an invariant interval onto different coordinate axes which are rotated wrt each other, so of course the projections are DIFFERENT, but not really "changed".

> On a piece of paper draw a 2−cm line L; draw Cartesian axes
> x−y, and x'−y' rotated wrt x−y. The projection of L onto the
> x axis is different from its projection onto the x' axis,
> but nothing has "changed" −− they were this way from the

> instant you drew L and defined the coordinate axes.

This is a subtle but important point: nothing is "changing", various measurements are different; that's all. And at base the measurements are different because they are measuring different things (e.g. a length measurement in the unprimed frame measures at constant t, but one in the primed frame measures at constant t').

> i.e A cubic meter of the vacuum state between galaxies
> has different characteristics to a cubic meter just outside an event horizon
> but in each place sol will be locally measured as constant but may not be
> the same relatively ?

If by "characteristics" you mean some physical quantity like the metric or curvature tensors, or perhaps gas density, ... −− certainly they can be different in different locations. And yes, in GR any LOCALLY−INERTIAL measurement of the speed of light will yield the answer c. But your phrase "may not be the same relatively" does not make sense to me.

> Maybe not in your terms but Lagrangians seem to be describing the actions of
> particles in systems not explaining what energy is,

Certainly the Lagrangian of a system does not, in general, by itself define energy. But if it is invariant over time translations then it does (via Noether's theorem). And if it is not so invariant, energy is not so useful....

> are you letting the metric follow the geometry or are you using a
> flat Euclidean geometry and metric and referring GR's geometry to this ?

The metric _IS_ the geometry. And in general it is not possible to "refer" a curved Lorentzian manifold to a "flat Euclidean geometry". Except for my (counter)example of SR above, I have been discussing GR and its general Lorentzian manifolds.

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