Re: GR ?

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- *From*: Tom Roberts <tjroberts@xxxxxxxxxx>
- *Date*: Sun, 24 Jul 2005 00:38:10 GMT

Significant Zero wrote:

> "Tom Roberts" <tjroberts@xxxxxxxxxx> wrote in message
> news:ImDDe.1901$fx4.1574@xxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
> | It is the way SR explains them. Just like rotations in 3D −− what
> | "explanation" do you use for the fact that a 10−foot−long ladder will
> | fit through a 3−foot−wide door in one orientation but not in another?
>
> Nice example but neither the doorway or the ladder change in physical
> reality only the relationship between the ladder and door.

Right. Ditto for "time dilation" and "length contraction" in SR −− neither clock nor ruler "changes in physical reality", only the relationship between moving clock and stationary clocks, or between moving ruler and stationary ruler.

> A rotation is a rotation −− in Euclidean space or in
> spacetime. Rotations affect projections of objects onto axes,
> but THEY DO NOT AFFECT THE OBJECTS THEMSELVES. A relative
> velocity is merely a rotation in the x−t plane. <shrug>
>
> | I say it is because the PROJECTION of the ladder's length onto the axis
> of
> | the door's width depends on their relative orientations.
>
> Yes as a physical fact.

No. You need a MODEL of the world to describe this. The only "physical facts" are whether or not it fits each time you apply ladder to doorway. Both geometrical projection and rotation are such models (well, parts of such models).

Just think of each application of ladder to doorway as a MEASUREMENT (of

ladder's length projected onto the doorway's width), and you'll see the relationship between this and "length contraction" and "time dilation" in SR. It's just that the ladder/doorway is quite familiar to you, but the SR effects aren't -- to understand SR you need to change that familiarity....

> | Similarly in
> | SR, the PROJECTION of a rod's length, and the PROJECTION of a clock's
> | tick-interval, depend on their orientation relative to the measuring
> | apparatus. This is, of course, orientation in spaceTIME.
>
> This is not a physical fact [...]

Right. It is a MODEL of myriad physical facts. Just like the rotation used for ladder and doorway.

> You appear to be mixing physical facts with observational and or
> mathematical ones and then forgetting which is which.

Not me. You. Rotation of ladder into doorway is no more "physical fact" than "time dilation" or "length contraction".

> | > | > i.e A cubic meter of the vacuum state between galaxies
> | > | > has different characteristics to a cubic meter just outside an event
> | > | > horizon[...]
> | > This may be difficult to explain but perhaps you will agree that a clock
> in
> | > the in the two vacuum cases above will tick at different rates,
> |
> | No, I don't agree to that highly-ambiguous statement.
>
> Well I did not think it was particularly ambiguous as if you don't agree to
> that then you must not agree that clocks generally run slower on earth than
> in space and you must now have switched to the view that GR is invalid ?

You keep insisting that this is a "difference" in the clock's tick rates. But in fact you have no basis for that particular prejudice -- all the actual MEASUREMENTS show is a difference in MEASUREMENTS. And that could be due to EITHER a change in clocks' tick rates or in the signals used for the measurements.

In GR this is modeled NOT as a "change in tick rates", and not in a

change of the local speed of the light signals used in the measurement, but rather as a curvature of spacetime. Only this last approach is general enough to account not only for this, but also "time dilation" and "length contraction" due to relative velocity, and fictitious forces like "centrifugal force" and "Coriolis force" and "gravitational force". That is, _ONE_ assumption explains many seemingly−unreleated phenomena, and that assumption is simply that the geometry of spacetime is Lorentzian (which implies it is locally Minkowskian).

> | In GR this is modeled as geometry in spacetime. To do that the intrinsic
> | rate of a clock cannot depend on its environment.

> All the proof seems to contradict you as the intrinsic rate of clocks
> appears the be dependent on Gravityand and velocity.

No. You are reading more into the MEASURMENTS than is there −− you are imposing your personal prejudice onto the data. DON'T DO THAT!!!

In fact, the MEASUREMENTS are exceedingly accurately predicted by GR, and in GR the intrinsic rate of clocks does NOT depend on either gravity or any velocity. All your statements clearly show that in order to understand this you need to STUDY.

> | The word "moving" does not apply to "time".

> I disagree, process is moving both in space and time.

"moving" means a change of spatial position over time. That CLEARLY cannot be applied to time itself. <shrug>

> | A simple way to avoid such nonsense is to remember that in physics
> | anything worth discussing must be MEASURABLE. How could one possibly
> | measure "motion of time"???

> With a clock.

That is measuring elapsed time, not "motion of time".

> | You clearly do not understand Lagrangians. Study them. Don't merely
> | fling words around without understanding.

I might if I was convinced they applied to fields.

Huh?? Lagrangians involving fields are the basis of ALL modern fundamental theories of physics. As I said, you need to STUDY.

> | Why do you think that it is impossible to cover the surface
> | of a sphere with a single coordinate system? That is
> | directly related to the impossibility I discuss here.

Latitude and longitude seem a fairly good system.

But not good enough −− they do not COVER the sphere S^2. Specifically: there are coordinate singularities at the north and south poles. I repeat: you need to STUDY.

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