Re: Principle of equivalence

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- *From*: rbwinn <rbwinn3@xxxxxxxx>
- *Date*: Wed, 16 Apr 2008 08:07:31 −0700 (PDT)

On Apr 16, 7:43 am, Bryan Olson <fakeaddr...@xxxxxxxxxxx> wrote:

> rbwinn wrote:
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>> Bryan Olson wrote:
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>>> rbwinn wrote:
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>>>> ý ýThe basic problem with current
>>>> interpretation of relativity can be
>>>> seen from considering two frames of
>>>> reference S and S' and how they
>>>> relate to the principle of equivalence.
>>>> ý ýS is a set of coordinates at rest and S' is a
>>>> set of coordinates in
>>>> motion in the x direction relative to S with a
>>>> velocity of v. ýLet S'
>>>> represent a train car in which we will drop a
>>>> cesium clock at t'=t=0
>>>> from the roof. ýIn S we construct an
>>>> apparatus on a floor level with
>>>> the train car floor at x=0 from which we will
>>>> drop an identical cesium
>>>> clock from a height equal to the height of the
>>>> train car roof.
>>>> ý ý ý Now the train car comes by at velocity
>>>> v and at t'=t=0 both
>>>> cesium clocks are dropped. ýIf we measure
>>>> the time on the cesium clock
>>>> in S when it hits the floor, scientists tell us
>>>> that the cesium clock
>>>> in S' will still be in the air at the time the S
>>>> clock hits and will
>>>> register a time of
>>>> t'=(t−vx/c^2)gamma at that moment.
>>>
>>> Scientists keep objecting to your imprecise statement there.
>>> In S,
>>> the clock at rest hits the floor−level apparatus before the

clock
on the train hits the floor.

So what are scientists objecting to?

Exactly what they said.

I said the same thing you did.

No, you did not. "If we measure the time on the cesium clock in S when it hits the floor" is gibberish. The time "on the clock" is what the clock reads, which is different from the time we measure in S.

Well, you are being pretty technical, but I will give you this one. We will do it this way. We put a clock on the floor and say, this clock represents t'=t, or "time we measure in S", as you put it. Now, again speaking very technically, the clock that hits the floor will measure slightly less time than the clock on the floor because it fell a few feet. I was just rounding off by saying that the two clocks would read the same, since the amount of time involved would be negligible.

Scientists tell us that the
experiment comes out the same in S and S'
because when the S' clock
does hit, it registers the same time that the S
clock registered when
it hit. Then if you looked at the experiment
from the frame of
reference of the train car, the S' clock would
hit first, and the S
clock would still be in the air and would
register less time than the
S' clock.

Fair enough.

ý ý ý Now we look at the experiment from
the perspective of Galileo,
who discovered the principle of equivalence.
ýWe will make one change
in the experiment.

You'd be better off going one step at a time. Changing both to Galileo's understanding of physics and changing the experiment has confused you.

It does not confuse me. Nothing changed in the experiment except the path of the S' clock, which now falls straight down as seen by the observer in S. Galileo was right about what he would see.

The Lorentz equations disagree with this.

Flat−out wrong. Big red X through the rest.

Show the math, Bryan. The S' clock hits at x=0.

t'=(t−vx/c^2)gamma = t gamma

In order to agree with Galileo's result, t' would have to equal t. If you can get t' to equal t, let's see you do it.

Ah, a challenge. That clock, as you said "will be sent opposite the direction of the motion of the train with a speed relative to S' that is equal to the speed of the train." Thus in S, the velocity of that clock is v=0.

gamma = c / (c**2 − v**2)**(1/2)
gamma = c / (c**2 − 0)**(1/2)
gamma = c / (c**2)**(1/2)
gamma = c / c
gamma = 1

t'=(t− v x/c^2) * gamma
t'=(t− 0 x/c^2) * 1
t'= t − 0
t'= t

You challenged me to show "t' would have to equal t". Challenge met.

Well, you did exactly what I said you would do. You flipped frames of reference and said the clock was in S. Figure it from S'.
If you can get it to work from S', I will have to say you have done something.

> [...]

>> Well, as I said, if you are correcting papers, just show the correct math as you see it.

> Done.

I have to give you an incomplete on this one.
Robert B. Winn
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