Re: Light clocks question

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"Stuart Gall" <stuart@otenet.gr> wrote in message
news:stuart−4890D0.00561213012005@news.otenet.gr...
> *Hello,*
> *I thought I had a pretty good grasp of special relativity then the other*
> *day I was thinking about the classic Einstein thought experiment with*
> *two light clocks one on a train and one on the embankment.*
>
> *I had a thought which I cant resolve.*
>
> *Say we have a sort of light clock with a laser at one end and a target*
> *at the other.*

The SR interpretation of the light clock thought experiment is as follows:
The track observer sees the light clock in the train is moving horizontally and thus he sees the light beam in the train is moving diagonally towards the target mirror on the roof of the train. Whereas the train observer sees the light beam is moving vertically and hits the target mirror on the roof of the train directly above the laser.

This SR interpretation is bogus. The correct interpretation is as follows:
The laser is consisted of a train of photons and each photon is emitted in the vertical direction with a speed of c. What the track observer saw is that the target mirror on the roof of the train have moved and this causes the first batch of photons to miss the target mirror and the number of photons missing the target mirror is dependent on the state of motion of the light clock.
The speed of the photons is much faster than the state of motion of the target mirror and thus the photons that are generated at a later time will have a chance to catch up and hit the target mirror. This means that the light clock will take a longer time to complete a period when it is in a state of motion and this is interpreted by SR as time dilation. Notice that as the light clock move at the speed of light the light clcok will not be able to complete any period and this is interpreted by SR as that time is standing still at the speed of light.

Ken Seto

> *>*
> *> Why does the observer on the embankment expect to see the light hitting*
> *> the target at all? In order for it to hit the target the light must have*
> *> had some perpendicular velocity component added to it (not possible by*
> *> special relativity)*
> *>*
> *> Say a photon is emitted from the laser and after it leaves the train*
> *> starts to move, presumably the photon will miss the target. Since the*
> *> motion of the train can not affect the photon after it has left the*
> *> laser. So if the train is in constant motion why would an observer on*
> *> the embankment expect to see the light move diagonally (from his point*
> *> of view) ?*
> *>*
> *> So I find three possibilities none seems right.*
> *>*
> *> 1. If there is no lateral velocity imparted on the light beam due to*
> *> movement of the laser then beam would only hit the target if the system*
> *> was "stationary" and we have a device for determining what at rest is.*
> *> motion of the ether etc − IMPOSSIBLE*
> *>*
> *> 2. If there is a lateral velocity imparted then consider this shine a*
> *> laser at a distant object, the moon say, move the laser 1M sideways. I*
> *> would expect the laser spot on the moon to move 1M sideways after a*
> *> short delay. However if there is any sort of lateral velocity imparted*
> *> then the light emitted while the laser source is in motion would move*
> *> further than 1M when it reached the moon (because it would have a*
> *> lateral velocity for the whole trip, so you would see the spot move way*
> *> out and then back to the 1M displaced position. But this cant be right*
> *> because source velocity is irrelevant.*
> *>*
> *> 3. Back to the trains the observer on the train who is stationary WRT*
> *> the apparatus sees the spot hit the target. The observer on the*
> *> embankment sees the laser go down in a straight line (from his point of*
> *> view) and since the target is in motion he sees the light miss the*
> *> target. But since the light hitting the target could be made to ring a*
> *> bell or blow up the train again we would have a mechanism for*
> *> determining "stationary". Whoever observes the light hits the target*
> *> when the bell rings is "stationary"*
> *>*
> *> Can anyone offer a forth possibility ?*
> *>*
> *>*
> *> Also consider this back to the moon experiment say we have a target on*
> *> the moon and we arrange to move it 1M sideways with the laser (like a*
> *> large light clock) consider the photons emitted just before the 1M mark.*
> *>*
> *> Future 1 − we stop at 1M what happens to the photons that left just*
> *> before the 1M mark?*
> *>*
> *> Future 2 − we keep going on to 2M what happens to the photons emitted*
> *> just before the 1M mark ?*

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> – –
> *Stuart Gall*