

Re: Length definition in SR – can anyone explain

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"David" <dseppala@xxxxxxxxxxxxx> wrote in message
news:v8lc42dpp731snaggm8eg2me89b5ne4q77@xxxxxxxxxxx

I'm trying to understand fundamental concepts of SR like time and length. In my posting about clocks I got a varied opinions of what constitutes a clock. This posting is a question about lengths. Can anyone explain why this is or isn't allowed in SR?

I'm in an inertial frame. Since the speed of light is constant I decide to make my standard unit of length equal to one light–second (the distance light travels in one second as measured by synchronized clocks in my inertial frame).

Now let there be an inertial frame moving along the x axis with velocity $V = 0.866c$ relative to my frame.

At time t_0 I fire two lasers for a one second burst. The length of each pulse is one light–second. The lasers are aligned along the x–axis. One points in the positive direction, the other points in the negative direction.

The moving observer measures the length of one pulse to be much less than the length of the other pulse even though in my frame they are identical.

What makes you decide that?

Try to explain your reasoning by defining some relevant events and calculating the lengths of the pulses in the moving frame. Start by drawing a little spacetime diagram.

Hint: in your equations, use the variable v in stead of the numeric value $0.866c$.

Dirk Vdm

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