the general science journal

Who then Measures the Relativistic Contracted Length, L?

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In Special relativity (SR), for a stationary observer (usually on Earth), the length of a moving object appears to be shorter than what he perceives. This is called length contraction or space contraction.

Suppose now that a rod of length L_0 moves with a relativistic speed υ along the positive x-axis, Fig. 1. According to SR, the length of this rod will contract in the direction of motion. A formula for this contraction is

$$L = L_0\sqrt{(1-\upsilon^2/c^2)}$$

where L is the contracted length of the moving rod, L_0 is its stationary length and c ($\approx 3 \times 10^8$ $m\ sec^{-1}$) is the speed of light.

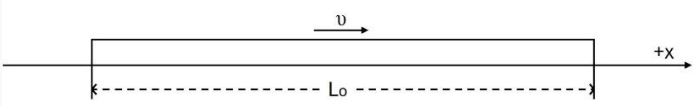

Fig. 1. A sketch of a rod moving at a relativistic speed υ along the positive x-axis. L_0 is its stationary length.

However, L_0[1] can be measured by both an Earth observer and an observer associated with the moving rod, but it is impossible for both to measure L. Now the inescapable question arises: who then measures the contracted length of the moving road, L, if both observers measure only its stationary length, L_0?

So, we conclude that it is impossible for both a stationary and a moving observer to measure relativistic time dilation [1] and length contraction.

Reference

[1] P. I. Premović, *Who then measures the relativistic time dilation, ΔT*? The General Science Journal.

[1] In SR, subscript 0 usually denotes the stationary reference system.