Yet another thought experiment by Ralph Malcolm Rabbidge

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1 Introduction

Ralph Malcolm Rabbidge, who is posting in the usenet-group sci.physics.relativity under the pseudonym Henry Wilson, has presented a thought experiment which he claims prove that velocities transform in a different way in Lorentz Ether theory than they do in the Special theory of Relativity.

I will show that this is not the case.

Ralph Malcolm Rabbidge's original post

Begin quotation of Ralph Malcolm Rabbidge's description of the though experiment

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Let a long rod be attached symmetrically to a clock that is moving at u
through the aether.
Because of its absolute speed, u, each half of the rod is contracted to
L.sqrt(1-u^2). The clock is running slow by the same factor.

Let two objects move at the same speed towards C, as measured in C's frame,
after being initially at rest at the ends of the rod.

       O1>v________L________C>u________L________v<O2

That means, according to C, they both take the same time T to traverse
distance L.

According to a clock at rest in the aether, that time is (T.sqrt(1-u^2)) and
the distances moved are equal.

Therefore in the aether frame, both objects move at an identical speed
towards C, just as they do in C's frame...

You calculation found those speeds to be different ...and by just the right
amount to cancel the absolute length differences of the rods. ..it's amazing
what circular logic can achieve....
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End quotation =====================

2 Calculation of the thought experiment according to LET

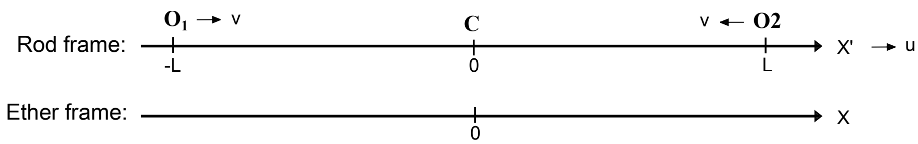

Figure 1: *The frames of reference*

There are three events of interest:

E_1: Object O_1 starts moving
E_2: Object O_2 starts moving
E_3: Object O_1 and O_2 reach the centre of the rod

The coordinates of these events in the rest frame of the rod are:

$$\begin{array}{lll} E_1: & t'_1 = 0 & x'_1 = -L \\ E_2: & t'_2 = 0 & x'_2 = L \\ E_3: & t'_3 = \frac{L}{v} & x'_3 = 0 \end{array}$$

Note that E_1 and E_2 are simultaneous in the rest frame of the rod.

The coordinates of these events in the ether frame of are:

$$E_1: \quad t_1 = \frac{t'_1 + \frac{ux'_1}{c^2}}{\sqrt{1-\frac{u^2}{c^2}}} = \frac{-L\frac{u}{c^2}}{\sqrt{1-\frac{u^2}{c^2}}} \qquad x_1 = \frac{x'_1 + ut'_1}{\sqrt{1-\frac{u^2}{c^2}}} = \frac{-L}{\sqrt{1-\frac{u^2}{c^2}}}$$

$$E_2: \quad t_2 = \frac{t'_2 + \frac{ux'_2}{c^2}}{\sqrt{1-\frac{u^2}{c^2}}} = \frac{L\frac{u}{c^2}}{\sqrt{1-\frac{u^2}{c^2}}} \qquad x_2 = \frac{x'_2 + ut'_2}{\sqrt{1-\frac{u^2}{c^2}}} = \frac{L}{\sqrt{1-\frac{u^2}{c^2}}}$$

$$E_3: \quad t_3 = \frac{t'_3 + \frac{ux'_3}{c^2}}{\sqrt{1-\frac{u^2}{c^2}}} = \frac{\frac{L}{v}}{\sqrt{1-\frac{u^2}{c^2}}} \qquad x_3 = \frac{x'_3 + ut'_3}{\sqrt{1-\frac{u^2}{c^2}}} = \frac{L\frac{u}{v}}{\sqrt{1-\frac{u^2}{c^2}}}$$

Note that E_1 and E_2 **not** are simultaneous in the ether frame.

The speed of O_1 through the ether is:

$$v_1 = \frac{x_3 - x_1}{t_3 - t_1} = \frac{\frac{L\frac{u}{v}}{\sqrt{1-\frac{u^2}{c^2}}} - \frac{-L}{\sqrt{1-\frac{u^2}{c^2}}}}{\frac{\frac{L}{v}}{\sqrt{1-\frac{u^2}{c^2}}} - \frac{-L\frac{u}{c^2}}{\sqrt{1-\frac{u^2}{c^2}}}} = \frac{\frac{u}{v}+1}{\frac{1}{v}+\frac{u}{c^2}} = \frac{u+v}{1+\frac{uv}{c^2}}$$

The speed of O_2 through the ether is:

$$v_2 = \frac{x_3 - x_2}{t_3 - t_2} = \frac{\frac{L\frac{u}{v}}{\sqrt{1-\frac{u^2}{c^2}}} - \frac{L}{\sqrt{1-\frac{u^2}{c^2}}}}{\frac{\frac{L}{v}}{\sqrt{1-\frac{u^2}{c^2}}} - \frac{L\frac{u}{c^2}}{\sqrt{1-\frac{u^2}{c^2}}}} = \frac{\frac{u}{v}-1}{\frac{1}{v}-\frac{u}{c^2}} = \frac{u-v}{1-\frac{uv}{c^2}}$$

3 Conclusion

We can see from the above that the speeds of the objects through Lorentz's ether are different.

The speeds transform in LET exactly as they do in SR.

Ralph Malcolm Rabbidge is proven wrong.

Again!