ASTRA NEWS

5th Issue

8/31/21

Hello everyone!

Enjoy the fifth issue of "Astra News"!

Yours,
Leonid

The covers for this issue were designed Leonid

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The Pumpkin Goes Back in Time

by Leonid Vishnevskiy

Listen: [The Pumpkin Goes Back in Time. MP3 (2:21)]

Today, I will be the first, or second, time traveler. My time machine is a box with a cylinder attached to it. I have noticed that my dad keeps using it, he keeps clicking something on it. And now I have discovered what to click on.

My dad says that it's a way of finding old memories. Quite a fancy way of putting it. But quite a wrong way: it is not memories that you see there, it is time. Past time.

There I open up the time machine. Its cylinder extends, and then I press the button. I can hear the sound, the sound of going back into time. The process begins, and soon the cylinder retracts.

Shortly, I arrive. I am only able to view some segments of time, but it is, or *was*, still the past.

I look at a lake, at a fish jumping right above it. I look at an owl flying, flying in the night. I look at myself, my younger self sitting on a chair and playing. Little did he know that he would become one of the first-time travelers. That little boy, sitting and playing with Play-Doh, the greatest toy to ever have existed, would make history.

I then hear my mom's voice.

"Mom, is that you?", I did not know that you could interact with the past using this time machine. "What year is it?", I ask.

"Pumpkin, what are you doing with Daddy's camera?"

Indeed, quite an odd year.

The end, written in 2021

When Light Leaves Us in the Darkness

Physics Problem Solving

by Leonid Vishnevskiy

You want to go to Andromeda, to see what another galaxy looks like. You've got some supplies, money and a basic idea. You're designing the spaceship to fly there.

You want to be travelling at double the speed of light. Of course, you take into account the effects of special relativity. Or you will now, anyways.

But soon, you return dumbfounded. Your answer does not make sense. The two methods that you used are supposed to give the same answers, but instead each gives a different answer from the other. One way with the formula, the other with a graph, i.e., visually. For instance, imagine that you're adding 2 and 3. One way on paper, so 2 + 3 = 5. And then visually: take 2 pencils and place 3 pencils next to them. Somehow, surprisingly, the answer doesn't equal to 5 this way. It makes no sense, right? That's what I'm talking about. This may not be the best analogy, but it's accurate enough.

And also, one more thing about the graph solution. In the pictures, you can see the x' (x prime) is above the ct' (ct prime) axis. But below the speed of light, i.e., how it is supposed to be, the x prime axis is below the ct prime axis. You could argue that the formulas need to be changed up a bit to reflect this, and then it would all work out. But how do we do this? We can't, at least according to our current laws of physics.

The current laws of physics do not permit you or anything to travel faster than the speed of light. And to travel at the speed of light, you have to be light itself. No solutions within our current laws of physics work at those speeds. Granted, there are some hypothetical theories that allow for this, but they have not been completely confirmed/checked, and some conflict with the current laws of physics. However, these problems may be solved if we find out that the current laws of physics are incorrect or incomplete and we find the new laws of physics that would allow for travel at double the speed of light.

But the problem of two different methods bringing in two different answers would still remain, right? I don't think that it would. With these new laws of physics, the methods to solve would change, and their answers would thus likely coincide with each other. If they don't…then travelling at double the speed of light may not be so possible, which would contradict these new laws.

Another thing: maybe the current methods to solve, the ones that caused us problems, are right but only below the speed of light. Or maybe they are practically right below the speed of light, i.e., below the speed of light they are still wrong, however they are close enough to reality to be used with no problems. This is how classical mechanics behaves with special relativity, except that classical mechanics starts having a noticeable difference with special relativity a little bit below the speed of light.

Will our current laws of physics ever prove to be wrong? I do not know. For a long time we thought that classical mechanics was correct in velocities, and then everything got switched in 1905 with special relativity, and then that continued by changing our understanding of gravity in 1915 with general relativity. General relativity by the way does not relate to our problem, at least not in the scope that we are looking in.

We might never know when we reach the final stage, the final correct laws. Maybe we already have? Or maybe there are no laws that can correctly define physics as we know it.

P.S. Please see Formula and Graph solutions on pages 4 and 5 respectively.

With formula:

v - speed of spaceship

$$x' = \gamma(x - \beta ct) \qquad ct' = \gamma(ct - \beta x)$$

$$\gamma = \frac{1}{\sqrt{1-\beta^2}} \qquad \beta = \frac{v}{c} \qquad \beta = \frac{v}{c} = \frac{2\cancel{c}}{\cancel{c}} = 2$$

$$\gamma = \frac{1}{\sqrt{1-\beta^2}} = \frac{1}{\sqrt{1-2^2}} = \frac{1}{\sqrt{1-4}} = \frac{1}{\sqrt{-3}}$$

$$x' = \gamma(x - \beta ct) = \frac{1}{\sqrt{-3}}(1 - \beta \cdot 1) =$$

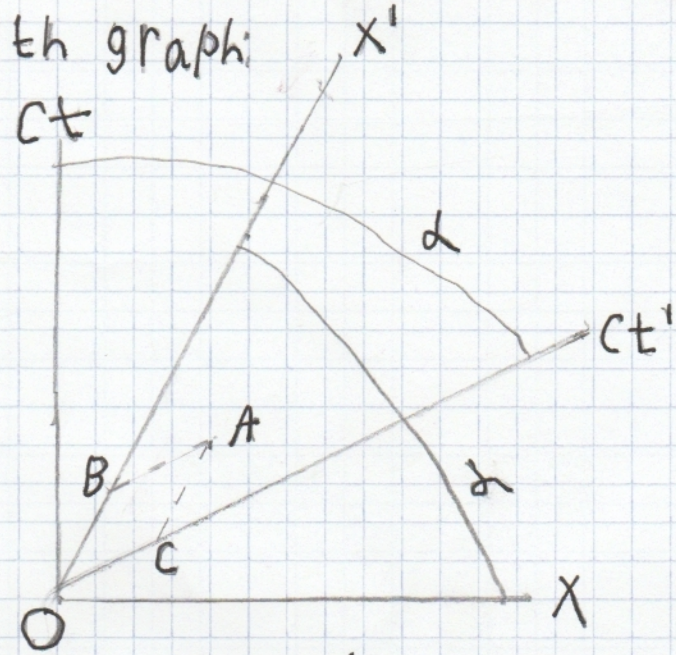
$$= \frac{1}{\sqrt{-3}}(1 - 2 \cdot 1) = \frac{1}{\sqrt{-3}}(-1) = -\frac{1}{\sqrt{-3}}$$

$$ct' = \gamma(ct - \beta x) = \frac{1}{\sqrt{-3}}(1 - \beta \cdot 1) = \frac{1}{\sqrt{-3}}(1 - 2 \cdot 1) =$$

$$= \frac{1}{\sqrt{-3}}(1-2) = \frac{1}{\sqrt{-3}}(-1) = -\frac{1}{\sqrt{-3}}$$

$$A = (x', ct') = \left(-\frac{1}{\sqrt{-3}}, -\frac{1}{\sqrt{-3}}\right)$$

With graph:



$$\alpha = \tan^{-1}\frac{v}{c} = \tan^{-1}\frac{2a}{a} = \tan^{-1}2 \approx 63.4^{\circ}$$

$BO \approx 1.9$

$CO \approx 2.3$

$A = (BO, CO) = (1.9, 2.3)$

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