Special Relativity as a Special Case of Quantum Mechanics

Terry Bollinger
2023-02-22.16:33 EST Thu
Message Excerpt

This is a follow-up to:
Angular Lorentz Factors and Time Contraction, Apabistia Notes (2023).
https://sarxiv.org/apa.2023-02-11.0012.pdf

Date: 2023-02-22.16:33 EST Thu
To: Terry Bollinger

Hi Terry, I hope you are keeping well!

TB> What's weird is that I can't get the idea out of my head that it's not a coincidence that applying quantum math, particularly fermion half-spin math, to R factors and the Lorentz factor gives a continuum between them."

[Ha, I too am] guilty of lack of rigour when deriving equations for the first time!

TB> Another issue: I still don't understand why the playback speed for external events is R (or 1/R dilation) forward and 1/R (or R dilation) backward. Seriously, would you happen to have any ideas on that point? Why is this number even showing up in the forward and backward cases?

I genuinely don't understand at the moment, either. Let me have a think and see if I can come up with an intuitive understanding.

TB> In any case, forward-looking, convergent $\sigma_0 = R$ (or $\gamma_0 = 1/R$) and backward-looking, $\sigma_\pi = 1/R$ (or $\gamma_\pi = R$) are never *symmetric in terms of causality.*

… this is much more satisfying, to be honest …

Date: 2023-02-23.22:26 EST Thu
From: Terry Bollinger

TB>> Another issue: I still don't understand why the playback speed for external events is R (or 1/R dilation) forward and 1/R (or R dilation) backward. Seriously, would you happen to have any ideas on that point? Why is this number even showing up in the forward and backward cases?

> I genuinely don't understand at the moment, either. Let me have a think and see if I can come up with an intuitive understanding.

Thanks! Any observations or insights would be much appreciated!

While doing a figure today on this topic, I think I noticed something that may be related:

If a passing observer looks at an external Lorentz area distance (rectangle), *both* the length and time diagonals are extended in the backward direction and compressed in the forward direction. I kept trying to make it a time or a length issue, but that's not how it works! It's two ways of looking at the combined *pair* of length and time diagonals of the Lorentz rectangle. One view looks at the obtuse angle and the squeezed (1/R) sides that link the diagonals, while the other focuses on the acute angle and the stretched (R) sides between them.

And guess what? Since this is a Lorentz area, the degree of extension or compression of the *paired* length-time diagonals is R in one direction and 1/R in the other.

I still don't understand what this pairing of length and time diagonals means, but it quickly pops out R in one velocity direction and 1/R in the opposite direction. Interesting!

But what does it mean? I'm so used to thinking of an *inverse* length-versus-time relationship that my brain doesn't know what to do when they both get stretched or squeezed simultaneously! Interesting, that!

TB>> In any case, forward-looking, convergent $\sigma_0 = R$ *(or* $\gamma_0 = 1/R$*) and backward-looking,* $\sigma_\pi = 1/R$ *(or* $\gamma_\pi = R$*) are* never *symmetric in terms of causality.*

> … this is much more satisfying to me, to be honest …

Oooo… yeah… causality! I mentioned those XT diagonal "scissors" positions to explain why R and 1/R pop out. Somehow these positions are related to causality, but I still don't see how. Interesting!

It's late. I'll look at this again tomorrow. Thanks as always for the stimulating feedback!

2023-02-25.10:54 EST Sat
From: Terry Bollinger

What follows is more a prediction based on trends than a hypothesis yet, but...

I suspect that stripping away the accidentally infinitely precise (and thus infinitely classical) xyzt framework from special relativity and entirely replacing it with these weird multi-scale loops that tighten or loosen causality leads to special relativity and quantum mechanics turning out to be the same thing, factored into two unequal pieces. We overlook the uncertainty inherent in special relativity because the hyperclassicality of the xyzt framework pushes all of the uncertainty down to the lowest self-observing units that we see as particles at their asymptotic limits. When interpreted using the much weirder multi-scale loop-convergence structures of Lorentz areas that underlie and enable the unreachable xyzt limit, special relativity may be just as probabilistic as quantum theory.

Exploring that idea should be fun!

2023-02-25.13:30 EST Sat
To: Terry Bollinger

TB> If a passing observer looks at an external Lorentz area distance (rectangle), the length and time diagonals are extended backward and compressed forward. I kept trying to make it a time or a length issue, but that's not how it works! It's two pairings of equal scale length and time diagonals, one with an obtuse angle that compresses their height and the other with an acute angle that increases their height.

Ah, interesting! So, this shape would constantly appear to be changing as the observer passed, and different parts would be in the forward and backward directions?

TB> ... special relativity and quantum mechanics [may turn] out to be the same thing, factored into two unequal pieces.

[Ha,] that would be excellent!

2023-02-25.16:12 EST Sat
From: Terry Bollinger

> So this shape would constantly change as the observer passed, with different parts in the forward and backward directions?

Interestingly, no. For example, for a trip at 0.6 c from Earth to Vega, the Lorentz distortion is specified entirely by R and thus v for the entire trip. (Incidentally, R is precisely 2 for v = 0.6 c, which is why I like to use that velocity.)

However, *three* Lorentz separations are involved. All have R distortions, but with three different dynamics:

La: Launch to Ship
Lb: Ship to Target
Lc: Launch to Target

La is the backward-looking *diverging* separation. La expands as the ship moves forward, and the ship observes R dilation — 1/R slower playback speed — of the Launch (Earth).

Lb is the forward-looking *converging* separation. Lb shrinks as the ship moves forward, and the ship observes 1/R dilation, that is, R faster playback speed, of the Target (Vega).

Lc remains *invariant* since neither of its endpoints has undergone acceleration.

The goal is a better understanding how diverging (expanding), converging (shrinking), and stable Lorentz areas interact.

Also — and I'm pretty sure this is important — I suspect quantum uncertainty emerges from competition between the two pairs of Lorentz area sides. The forward view focuses on stretching length and duration (R), while the backward view focuses on compressing length and duration (1/R). Classical velocity locks in the time dilation in the forward direction but simultaneously makes the length dilation in the forward direction interpretation irrelevant by converting it, at least in the launch frame, into what we think of as motion, rather than stretching, of the object over time.

In special relativity, velocity removes that competition by causing the stretched pair to dominate and break down motion. However, in other contexts, the shorter side may win out, and for in-between cases, you probably get the kind of uncertainty we call quantum.

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