Time for a Surprise

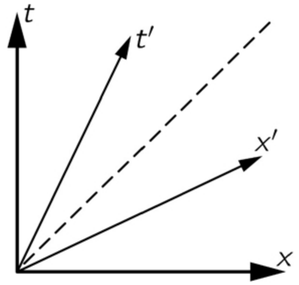
Here is one version of the Lorentz equations for converting the unit xt square into the unit $x't'$ square. They were discovered by Woldemar Voigt in 1887:

$$x' = \gamma\big(x - t(\beta c)\big)$$
$$t' = \gamma\big(t - x(\beta/c)\big)$$

Where:

$$\beta = v/c$$
$$\gamma = 1/\sqrt{1-\beta^2}$$

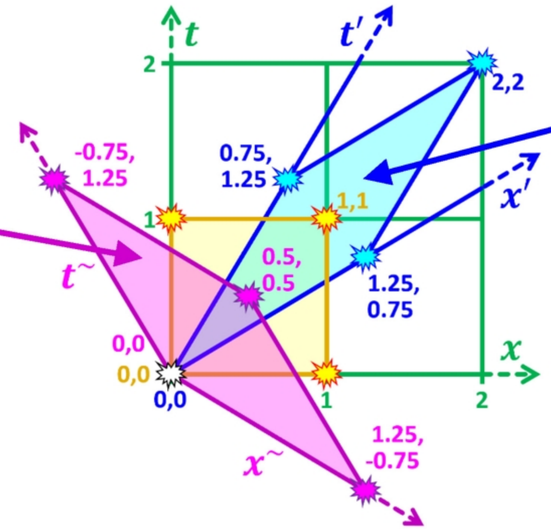
Here are the xt and $x't'$ axes from Feynman's lectures:



The surprise: The $x't'$ **variables** used in these two very standard examples **are not the same**

Houston, We Have a Problem

Transformation of the light-bar unit square using the **Lorentz equation definitions** of x' and t' **(FLATLY INCORRECT)**



Transformation of the light bar according to the **axes definition** of x' and t' **(LABORATORY VALIDATED)**

A Quick Resolution (for Now)

Here is the summary, for now, of the situation:

WRONG FRAME MAPPING

$$x' = \gamma\big(x - t(\beta c)\big)$$
$$t' = \gamma\big(t - x(\beta/c)\big)$$

Where:

$$\beta = v/c$$
$$\gamma = 1/\sqrt{1-\beta^2}$$

- When comparing two frames, this leads to a mixed-signature Minkowski space
- You can no longer use Euclidean

CORRECT FRAME MAPPING

$$x' = \gamma\big(x + t(\beta c)\big)$$
$$t' = \gamma\big(t + x(\beta/c)\big)$$

Where:

$$\beta = v/c$$
$$\gamma = 1/\sqrt{1-\beta^2}$$

- When comparing frames, this leads to **fully Euclidean spaces** that fully preserve causality
- "Block" universes are *not* needed

A Non-Paradoxical Superposition Model

- Once space is reduced to not much more than pointer entries in small, locally-owned, matter-limited spreadsheets, an entirely new model of superposition becomes possible:

  The only entities superposed in quantum mechanics are multi-scale definitions of spacetime. The entities themselves exist and change internally without any need for specific locations in the larger universe, and they remain singular and finite at all times.

- This combination resembles a pilot-wave model (which was a big surprise to me), but without the particles ever traversing "real" space; e.g., they never move through one or the other of two slits. The slits merely induce a novel set of updates to location entries.