

Excited Velocity States, Not Acceleration, Cause Time Dilation

Terry Bollinger

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https://youtu.be/ZdrZf4lQTSg?lc=Ugx_4NFmYJxSQ77XBB14AaABAg

A Comment on the Sabine Hossenfelder post:

Special Relativity: This Is Why You Misunderstand It (Jan 7, 2023)

<https://youtu.be/ZdrZf4lQTSg?t=12m7s>

[12:07](#) "This is the real-time dilation — it comes from acceleration." No. This idea is old and widely quoted but also experimentally wrong. If you accelerate, say, muons, it's possible to make the acceleration period vanishingly small, yet the muons time dilate in a directly and incrementally measurable fashion during their non-accelerated travel phase.

The source of time dilation is time spent in an excited velocity state relative to the non-excited launch frame. An excited velocity state is nothing more than one that costs energy to create.

A near-light-speed spaceship is an enormous velocity excitation relative to the earth, so as long as one twin stays in that velocity state, she ages slower — period, without exception, and continually as she travels.

What throws folks off is thinking that this simple aging rule — that is, that you always age faster if it took energy to get you into that velocity state — contradicts the Poincaré symmetries.

The spiel about integrating acceleration curves is a century-old bit of math noise that breaks a sequence of velocity excitations into small enough pieces to make folks feel like the curve breaks the symmetry. It's pure noise and belongs in the trashbin of ideas that obscure rather than explain.

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PDF: <https://sarxiv.org/apa.2023-01-07.0930.pdf>