The Relativistic Framework Unfit for Scientific Studies

Vesselin C. Noninski
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The main issue in papers such as those of Shi et al[1], Yuan et al[2], Feinland et al[3], and others using the relativistic framework, countering such an approach, is that it has been known since the times of Galileo the transformations of a physical law across inertial systems $(physical\ law)_K \longrightarrow (physical\ law')_k$ does not depend on the velocity v between frames for any velocity v magnitude. Thus, even if the law, say, $\frac{d^2x}{dt^2} = \frac{\epsilon}{m}X$ in frame K, where m is the mass of the electron, ϵ is electron's charge and X is the x-axis component of the electric field vector, is deliberately transferred (correctly) into frame k as $\frac{d^2\xi}{d\tau^2} = \frac{\epsilon}{m}X'$, where the Greek letters are the coordinates in frame k and X' is the electric field component in k, and then transferred (incorrectly) back into K via the Lorentz transformations (LT) as $\frac{d^2x}{dt^2} = \frac{\epsilon}{m\beta^3}X$ (where β^3 is usually denoted as γ^3 in modern literature), in order to leave an impression that $\frac{d^2x}{dt^2} = \frac{\epsilon}{m}X$ and $\frac{d^2x}{dt^2} = \frac{\epsilon}{m\beta^3}X$ are two distinct expressions of the law. However, this approach falters because, first of all, $\frac{d^2x}{dt^2} = \frac{\epsilon}{m}X$ is valid for all values of the velocity v of k, external to K, therefore, at no velocity v can there be another law $\frac{d^2x}{dt^2} = \frac{\epsilon}{m\beta^3}X$ coexisting in K with $\frac{d^2x}{dt^2} = \frac{\epsilon}{m}X$ describing the acceleration of one electron, in one frame K, at the same time. The quantity $\frac{d^2x}{dt^2}$ in K referring to such one electron moving at $v \neq 0$ can have only one value, not two; $\frac{\epsilon}{m}X = \frac{\epsilon}{m\beta^3}X$ is valid only for $v = 0$, which defies relativity.

To reinforce the conclusion that the relativity framework is non-physical, it may be observed that, while the components say X and Y, of the electric field vector in frame K transform in k as X' and Y', the relativistic framework requires these components to transform as X', and $\frac{Y'}{\beta} + \frac{v}{c}N$. In other words, relativity requires that $Y = \frac{Y'}{\beta} + \frac{v}{c}N$, which, again, can only be true if $v = 0$, $\beta = 1$, challenging relativity's premise, while $Y = Y'$ is valid for all v. To say nothing of the fact that $Y = \frac{Y'}{\beta} + \frac{v}{c}N$ is dimensionally inconsistent in the SI unit system, a flaw cloaked by Gaussian units or ad hoc adjustments in natural units, masking the issue in unit-agnostic derivations.

The observed $Y = \frac{Y'}{\beta} + \frac{v}{c}N$ expressed in SI units, $[Y] = \left[\frac{\mathrm{kg \cdot m}}{\mathrm{s^3 \cdot A}}\right] \neq \left[\frac{v}{c}N\right] = \left[\frac{\mathrm{kg}}{\mathrm{s^2 \cdot A}}\right]$, reveals LT's inconsistency—$Y \neq \frac{Y'}{\beta} + \frac{v}{c}N$ mainly because of the shown v-

inconsistency, but also because of the dimensional mismatch $[Y] \neq \left[\frac{Y'}{\beta} + \frac{v}{c}N\right]$, isn't a flaw to fix but a lens on LT's irregularity. Gaussian units ($[\mathbf{E}] = [\mathbf{B}]$) conceal this; SI reflects physical distinctions—$\boldsymbol{E}\left(\frac{force}{charge}\right)$ and $\boldsymbol{B}\left(\frac{\text{force}}{\text{velocity}\cdot\text{charge}}\right)$ remain distinct. In SI, Faraday's law is $\nabla \times \boldsymbol{E} = -\frac{\partial \boldsymbol{B}}{\partial t}$, Ampère's law $\nabla \times \boldsymbol{B} = \mu_0 \boldsymbol{J} + \mu_0 \epsilon_0 \frac{\partial \boldsymbol{E}}{\partial \boldsymbol{t}}$; in Gaussian units, $\nabla \times \boldsymbol{E} = -\frac{1}{c}\frac{\partial \boldsymbol{B}}{\partial t}$, $\nabla \times \boldsymbol{B} = \frac{1}{c}\frac{\partial \boldsymbol{E}}{t} + \frac{4\pi}{c}\boldsymbol{J}$. SI's μ_0 and ϵ_0 preserve $\boldsymbol{E}$ and $\boldsymbol{B}$'s roles; Gaussian's c-scaling equates them, masking LT's error. Yet, SI rewrites—e.g., $E'_y = \beta(E_y - vB_z)$, $B'_y = \beta\left(B_y + \frac{v}{c^2}E_z\right)$—acknowledging the discrepancy by outright *ad hoc* adjustment. Why adjust a "fundamental" transformation to fit units? If LT were valid, rewriting wouldn't be needed—Gaussian's alignment doesn't justify SI's mismatch. It's a contrivance, suggesting LT's v-dependence lacks physical grounding. SI's mismatch signals LT's failure—$\boldsymbol{E}$ and $\boldsymbol{B}$ shouldn't mix this way if Galileo's discovery holds, and it does—while Gaussian's artificial unity bends physics to fit relativity, equating $\boldsymbol{E}$ and $\boldsymbol{B}$ despite their distinct roles. Units shouldn't dictate physics—laws must be invariant across systems. LT's reliance on Gaussian alignment or SI's "c-normalization" (scaling with c or c^2) exposes a flaw beyond dimensions, rooted in *the principle of conservation of coordinates*—ultimately, *the principle of conservation of truth*, the tenor of this work.

The question of which transformation should be preferred, the one discovered by Galileo or the one resulting from the application of the Lorentz transformations, the answer is straightforward—no one has yet rejected Galileo's discovery that no experiment carried out in an inertial frame can detect that said frame is in uniform translatory motion or whether it is at rest relative to other inertial frames. As far as the Lorentz transformations go, they can detect such motion, which is raising doubts, to say nothing of the fact that they can be shown unphysical in a number of other ways. For instance, LT destroy the very notion of length itself. LT's: $x' = \beta(x - vt)$ and $t' = \beta\left(t - \frac{vx}{c^2}\right)$ give for a rod at $x_1 = 0, x_2 = 1, t = 0$ in K, with $v = 0.6c, c = 1, \beta = 1.25$, endpoints $x'_1 = 0, t'_1 = 0, x'_2 = 1.25, t'_2 = -0.75$ in k—an illusion, not a rod, its ends non-coexistent (one present, one past) to define length. You may note that for every x, t pair there will be a discrepant x', t' pair, making it impossible for two points to coexist so length can be defined. This length dissolution of the $L' = \frac{L}{\gamma}$ can never prevent.

After LT are applied, no length exists to ruminate about length contraction, let alone time dilation.

The mentioned studies do include sections involving relativity. Shi et al.[1] claim "relativistic diffusive shock acceleration" boosts foreshock electrons from 10 eV to 200 keV, invoking γ^3 to adjust acceleration—implying two laws for one electron in K, defying Galileo's single-motion truth. Yuan et al.[2] report "relativistic energy" (>0.3 MeV) from stochastic acceleration in lab plasmas, using LT-based PIC sims to jump from thermal electrons—suggesting a second law beyond $\frac{\epsilon}{m}X$, clashing with one-value invariance. Feinland et al.[3] observe "highly relativistic" 1 MeV microbursts from the inner belt, tied to lightning and bounce periods (0.94c); though not explicit, their relativistic framing leans on LT's v-shifts, splitting motion states against Galileo's unified law.

However, the minute relativity is mentioned, it should be realized that the study hinges on LT—no matter how LT are applied. No experiment backs LT tweaks. Apply LT and there will always be two simultaneous distinct expressions describing one phenomenon. These arguments should make it question employing the relativity framework in any cosmology study, or any other scientific study for that matter.

References

1. Shi et al. Compound electron acceleration at planetary foreshocks. *Nat. Commun.* **2025**, DOI: 10.1038/s41467-024-55464-8.
2. Yuan et al. Electron stochastic acceleration in laboratory-produced kinetic turbulent plasmas. *Nat. Commun.* 15: 5897 (2024).
3. Feinland et al. Lightning-induced relativistic electron precipitation from the inner radiation belt. *Nat. Commun.* 15: 8721 (2024).