

Response to “Reinterpretation of the Michelson-Morley Experiment and Its Consequences for Cosmology” by V. Vavryčuk

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Abstract

The paper “Reinterpretation of the Michelson-Morley experiment and its consequences for cosmology” by Vaclav Vavryčuk claims that the Lorentz transformation’s physical interpretation is flawed and advocates for a “Doppler metric” instead of the standard Minkowski metric as a better description of spacetime distortion, an idea that contradicts the well-established foundation of Einstein’s Special Relativity and is not supported by mainstream physics.

Keywords: Minkowski metric, Lorentz metric, Michelson-Morley experiment, preferred reference frame, relativistic time dilation, Doppler transformation

1. Introduction

In his new paper (V. Vavryčuk, 2025), Mr. Vavryčuk continues his assault on mainstream physics in general and on special relativity in specific. He writes:

In this paper, we revisit the conventional interpretation of the MM experiment and identify errors in the analysis of its null result reported by Michelson and Morley. We show that interferometric measurements can be accurately described within classical wave theory under the assumption of absolute spacetime. Central to this reinterpretation is the correct treatment of the Doppler effect via the Doppler transformation instead of the Lorentz transformation. This approach remains consistent with Einstein’s postulate of the constancy of the speed of light, but assumes the invariance of phase velocity rather than group velocity. Our results align with CMB

observations, reinforcing the idea of a preferred reference frame.”

2. Key Reasons Why the Paper Should Have Been Rejected Outright (And Should Be Withdrawn Right Away)

- **Rejects Special Relativity:** The core premise challenges Einstein’s Special Relativity, which arose from the Michelson-Morley (in short, MM) experiment’s null result, by suggesting an “absolute spacetime” or preferred frame (the CMB frame in which light speed is isotropic).
- **The Paper Is Ignorant of Basic Experimental Physics (both relativistic and non-relativistic):** there is no “Doppler effect” in MM for the simple reason that there is NO relative

motion between the light source and the receiver. All calculations presented by the author are plain wrong and fly in the face of basic experimental physics. Misinterprets the MM Null Result: Instead of the expected “ether wind” effect being absent (proving undetectable “ether”), the papers known as fringe cited by Mr. Vavryčuk (Consoli, Gift, Cahill, Dingle!) argue that tiny residuals *were* detected, indicating Earth’s motion relative to the CMB frame in which light speed is isotropic, a view mainstream physics dismisses as instrumental noise and ignorance of error bars (T. Roberts, 2006). Moreover, the author conveniently misses the fact that in a non-dispersive medium (like the vacuum used in MM), group and phase velocity are the same, there is no difference.

- **Clashes with CMB Observations:** While proponents link their findings to CMB data, the interpretation that MM detects a *preferred frame* via fringe shifts contradicts the CMB’s observed isotropy and standard cosmological models.
- **Contradicts Vast Evidence:** It goes against decades of experimental evidence (modern re-enactments of the MM tests, GPS, particle physics) consistently supporting Special Relativity and General Relativity. Interestingly enough, the author cites some of the contemporary papers (K. Laemmerzahl, H. Muller, G. Saathof) while completely misinterpreting them to suit his purposes.
- **Alternative Theoretical Framework:** The paper proposes replacing the Lorentz transformation with a “Doppler transformation” and advocates for a non-standard “Conformal Cosmology” (CC) that differs significantly from the widely accepted Lambda-CDM (Λ CDM) model of the expanding universe. Mainstream physics considers the Lorentz transformations as a cornerstone of modern physics, repeatedly verified by numerous other experiments (e.g., Ives-Stilwell,

Mössbauer rotor experiments, modern optical whispering cavity tests).

- **Claimed Resolution of Fundamental Problems:** The paper claims its framework “resolves several longstanding issues in cosmology, such as the need for dark matter and dark energy” and explains phenomena like flat galaxy rotation curves and galaxy expansion within the CC approach. These claims are not supported by the broader scientific community, which relies on the vast body of evidence underpinning the Λ CDM model.
- **Lack of Broad Scientific Acceptance:** The paper’s reinterpretation has not been accepted by the general consensus of physicists. The vast majority of the scientific community regards the original MM experiment, along with its many repetitions and modern variants, as conclusive evidence for the principles of relativity.
- **A Rehash of a Similar Paper (V. Vavryčuk, 2024) That Was thoroughly Debunked:** The author reprises arguments for replacing the Lorentz transforms with the “Doppler transforms” despite the fact that I have shown that his computation of the metric is incorrect, leading to the false claim that relativistic time dilation is inexistent and to the denial of the Ives-Stilwell class of experiments.

3. Basic Computational Errors

There are many such errors (all of them stemming from the same basic misunderstanding), I will highlight only the most egregious one. The author writes:

“However, the original Michelson-Morley derivation of the interference phase shift, as presented in the previous section, is awed. The fundamental misconception lies in neglecting the Doppler effect, which arises from the difference between phase velocity and group (signal) velocity of light. The Doppler effect causes variations in the angular frequency of light along different propagation paths, contradicting the assumption made by Michelson and Morley that the frequency remains constant.”

From this point the author proceeds by ignoring the fact that source and receiver move AS A UNIT, there is NO RELATIVE MOTION between them,

so there is NO “Doppler effect” of any kind. Generations of physicists have known that, so there was no “ignoring” such an effect by prior generations of specialist because the effect CANNOT exist. So, the complex calculations presented in the paper are all invalid.

4. Conclusions

The paper offers an alternative narrative to the established scientific story where the MM experiment was a pivotal failure for the ether theory, paving the way for Special Relativity. These kind of papers present it as a misunderstood success for an “ether” (or CMB frame), requiring a complete physics overhaul, which lacks broad acceptance in the physics community. In conclusion, there are too many fundamental errors in the published paper, it should have been withdrawn, together with reference (V. Vavryčuk, 2024) (recently refuted in A. Sfarti (2026)) since both are an embarrassment for MPLA.

References

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