

## Optics Journal: Editorial

Published 2011/09/27  
©Optics Journal (2011)

ISSN: 1936-9808

# Neutrino velocity

Recently, the news have been dominated by a preprint generated from the OPERA neutrino experiments at CERN [1]. In this manuscript, a large number of authors report on results of some 16000 neutrino interaction events over a propagation distance of about 730 km. These authors report on a difference of the muon neutrino velocity, relative to the speed of light  $c$ , corresponding to some 60 ns [1], or

$$(v - c)/c = (2.48 \pm 0.28(stat) \pm 0.30(sys)) \times 10^{-5}$$

Reading the manuscript it becomes immediately apparent that these are intricate measurements that integrate GPS technology with a plethora of additional experimental and metrology techniques.

Let us remember that scepticism and doubt are central to the ethos of physics. In this regard, the OPERA data should be re-examined in detail and additional experiments should be planned to either confirm or deny the validity of the reported measurements. That's the way physics works.

However, it is interesting to note that, if independently confirmed, these results will have little or no impact on modern technology. This technology is overwhelmingly based on Newtonian mechanics, optics, electromagnetism, semiclassical physics, and non-relativistic quantum mechanics.

Nevertheless, as a physics student I was fascinated with Einstein's Special Relativity and Lorentz Transformations, and will observe with keen interest the fate of the neutrino measurements.

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### Reference

1. T. Adam *et al.*, Measurements of the neutrino velocity with the OPERA detector in the CNGS beam, arXiv:1109.4897 (PDF)