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**Appearance and reality: Einstein and the early debate on the reality of length contraction. (English summary)**

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Among the more curious of Einstein's writings on the special theory of relativity, and one that has attracted its fair share of commentary, is a short response he made in 1911 to Vladimir Varičak's view of the Lorentz-FitzGerald contraction (LFC) as purely psychological [A. Einstein, *The collected papers of Albert Einstein. Vol. 3*, edited by Martin J. Klein, A. J. Kox, Jürgen Renn and Robert Schulmann, Princeton Univ. Press, Princeton, NJ, 1993; MR1261416]. The latter view, which Einstein sought to marginalize, never gained much credence in scientific circles. The circumstances of Einstein's response, its scope and intention, are better known thanks to the publication of Einstein's letters to Varičak [A. Einstein, *The collected papers of Albert Einstein. Vol. 10*, edited by D. K. Buchwold, T. Sauer, Z. Rosenkranz, J. Illy and V. I. Holmes, Princeton Univ. Press, Princeton, NJ, 2006]. The paper under review exploits this archival find in the service of an "Einsteinian pedagogy" of length contraction, in contrast to the "Lorentzian pedagogy" promoted by John S. Bell in the 1980s [*Speakable and unspeakable in quantum mechanics*, Cambridge Univ. Press, Cambridge, 1987; MR0915338].

In a nutshell, Einstein's correspondence reveals his view of the LFC as an effect both real (i.e., measurable with ideal rods and clocks) and merely apparent (i.e., not measurable by a co-moving, inertial observer). The paper considers Einstein's response in the wake of the so-called Ehrenfest paradox, which concerns the extension of special relativity to uniformly rotating frames. It presents Einstein's view of the LFC, leaving unexplored connections to the competing views of length contraction offered by Minkowski, Varičak, H.-A. Lorentz and Henri Poincaré.

As an example of Einsteinian pedagogy, the paper revisits the null result of A. A. Michelson and E. W. Morley's 1887 ether-drift experiment [London, Edinburgh, Dublin Philos. Mag. J. Sci. **24** (1887), no. 151, 449–463, doi:10.1080/14786448708628130]. While this result has long been understood as a trivial consequence of the two postulates of Einstein's special theory of relativity, the paper recalls that it is also consistent with relativistic kinematics. The longitudinal arm of the Michelson-Morley interferometer in translation with respect to a frame at rest with the solar center is thus contracted, in full agreement with the views of the ether theorists Lorentz, Max Abraham and Poincaré, but without an ether.

The paper distinguishes between the *pedagogy* on display in Einstein's published response to Varičak, and his *philosophy* of space and time. It notes Einstein's candid acknowledgment, in a letter to Lorentz, that he had, on occasion, fallen into the error of presenting the LFC as an appearance resulting from relativistic kinematics, instead of a real, measurable effect.

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