

Abstract Submitted  
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**High-precision comparison of two optical ion clocks for hundred-fold improved bounds on Lorentz violation** CHRISTIAN SANNER<sup>1</sup>, NILS HUNTEMANN, RICHARD LANGE, CHRISTIAN TAMM, EKKEHARD PEIK, Physikalisch-Technische Bundesanstalt, MARIANNA SAFRONOVA, SERGEY PORSEV, University of Delaware — We present a long-term frequency comparison over a period of six months between two optical clocks with single  $^{171}\text{Yb}^+$  ions in separate ion traps, showing an agreement to within  $3 \times 10^{-18}$ . The two ions with their anisotropic electron momentum distributions in the metastable  $^2F_{7/2}$  manifold are aligned along orthogonal quantization axes tilted with respect to Earth's axis of rotation. From the absence of an observed sidereal modulation of their frequency difference on the  $2 \times 10^{-18}$  level we deduce limits on a possible violation of Lorentz symmetry for electrons (and photons) in the range of  $10^{-21}$ , an improvement on previous experiments [T. Pruttivarasin et al., Nature 517, 592 (2015)] by two orders of magnitude.

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