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**Limits on violations of Lorentz symmetry and variation of the fine-structure constant using radio-frequency spectroscopy of atomic dysprosium** NATHAN LEEFER, MICHAEL HOHENSEE, Physics Department, University of California, Berkeley, CHRISTIAN WEBER, Technische Universität Berlin, DMITRY BUDKER, Physics Department, University of California, Berkeley, CELAL HARABATI, VLADIMIR DZUBA, VICTOR FLAMBAUM, School of Physics, University of New South Wales — Atomic dysprosium (Dy) has been found to be a useful system to look for new physics beyond the Standard Model and General Relativity. Large relativistic corrections to electron energies, owing to the high nuclear charge ($Z = 66$), make the energies of atomic states in Dy highly sensitive to proposed variations of the fine-structure constant, $\alpha$. Due to the reduced screening of the nuclear charge, the relative energy of excited states in Dy are also sensitive to violations of Local Lorentz Invariance (LLI) and the Einstein Equivalence Principle (EEP) as parametrized by the Standard Model Extension. The existence of an electric-dipole transition between a pair of nearly-degenerate excited states in Dy allows us to place some of the best limits on these effects with relatively low precision radio-frequency spectroscopy. We present the results of our analyses of over two years of data to constrain variation of $\alpha$ at the level of $|\dot{\alpha}/\alpha| < 10^{-16}$ yr$^{-1}$. In the context of the Standard Model Extension we bound violation of LLI for electrons at the level of $10^{-17}$ for the $c_{\mu\nu}$ tensor that modifies the kinetic term in the electronic QED Lagrangian.

Nathan Leefer
Physics Department, University of California, Berkeley

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