Abstract Submitted
for the DAMOP19 Meeting of
The American Physical Society

Updates on Yb optical lattice clocks at NIST YOUSSEF HASSAN, WILLIAM MCGREW, XIAOGANG ZHANG, ROBERT FASANO, DANIELE NICOLODI, KYLE BELOY, WESLEY BRAND, STEPHAN SCHAFFER, ROGER BROWN, JIAN YAO, JEFFREY SHERMAN, THOMAS PARKER, HOLLY LEOPARDI, TARA FORTIER, ANDREW LUDLOW, National Institute of Standards and Technology — Optical atomic clocks have enabled the next generation of precision measurement surpassing the performance of the current cesium standard. The Yb optical lattice clock is one strong candidate for redefining the SI second, with recent progress in the systematic uncertainty, measurement instability, and reproducibility at or below the 10^{-18} fractional level. Here, we report an improved absolute frequency measurement of the Yb clock transition frequency at an inaccuracy limited by the current definition of the SI second. These measurements are analyzed to yield an improved constraint on possible variation in the electron-to-proton mass ratio. We also highlight high-precision optical-frequency-ratio measurements using optical clocks at NIST based on Yb, Sr, and Al^+. Finally, we describe recent efforts to improve the clock transition detection scheme and blackbody radiation shift uncertainty in the Yb lattice clock.

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Date submitted: 03 Feb 2019 Electronic form version 1.4