Abstract Submitted
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A Portable E1-M1 Optical Clock[1] EMILY ALDEN, AARON LEANHARDT, University of Michigan - Physics — The frontiers of precision time measurement are improving rapidly. The pursuit of the lowest clock stability has produced a measurement of time dilation from to an elevation change of less than a meter[2] and creates the potential for tabletop tests of fundamental constants. We present a new setup for an optical frequency standard that accesses the $E1$ forbidden ${}^1S_0 \rightarrow {}^3P_0$ clock transition by a two-photon allowed $E1 - M1$ clock transition along ${}^1S_0 \rightarrow {}^3P_1 \rightarrow {}^3P_0$. This pathway has the potential to permit detectable clock transitions for atoms at room temperature. Further, the transition can be driven using Doppler-free spectroscopy techniques which immediately remove the dominant broadening mechanism for single-photon clocks at room temperature. Operating with hot atoms removes the extensive state preparation required by other optical frequency standards and thus makes the clock more portable that ion or lattice systems. We present the basic components of this novel technique and progress toward a hot neutral Hg clock.

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[2]C.W. Chou, D.B. Hume, T. Rosenband, and D.J. Wineland, Science 329, 1630 (2010)

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