Abstract Submitted
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Ytterbium Optical Lattice Clock NATHAN LEMKE, University of Colorado-Boulder and NIST-Boulder, ZEB BARBER, NIST-Boulder, NICOLA POLI, LENS and Universita di Firenze, CHRIS OATES, LEO HOLLBERG, NIST-Boulder — We report on an optical clock based on the $^1S_0-^3P_0$ transition in neutral Yb atoms confined to a Stark shift-free optical lattice. Tight confinement of atoms to the Lamb-Dicke regime is shown to suppress Doppler- and recoil-related shifts, while the Stark shift-canceling technique eliminates the clock's first-order sensitivity to lattice intensity. Clocks based on magnetically-induced spectroscopy of ^{174}Yb (I=0) and state-resolved spectroscopy of ^{171}Yb (I=1/2) are demonstrated. Comparisons with other optical and microwave frequency standards via a self-referenced femtosecond frequency comb have enabled initial measurements of the absolute frequency and systematic effects with a fractional uncertainty of 10^{-15}, a level that can be reached in 10 seconds of averaging time.

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