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A Spin-1/2 Optical Lattice Clock based on Yb Atoms NATHAN LEMKE, ANDREW LUDLOW, ZEB BARBER, YANYI JIANG, TARA FORTIER, SCOTT DIDDAMS, CHRIS OATES, NIST Boulder — The $^1S_0$–$^3P_0$ transition in lattice-confined alkaline earth-(like) atoms has become a prime candidate for the next generation of optical frequency standards. To date, the work on lattice clocks has centered on bosonic atoms with no angular momentum (I=0) and on fermionic atoms with high angular momentum (I=9/2). Here we report on a different type of fermionic system, ^{171}Yb (I=1/2). Such a system has several advantages over higher angular momentum systems, including its simple structure and straightforward manipulation of the nuclear spin state, while not suffering from spectroscopic field shifts that may limit the accuracy of clocks based on bosonic atoms. We have completed a frequency evaluation of the clock transition in ^{171}Yb with a systematic uncertainty of 3.6 x 10^{-16}.

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