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Progress toward an Yb Optical Lattice Clock ZEB BARBER, NIST-Boulder/Univ. of Colorado, JASON STALNAKER, CHRIS OATES, LEO HOLLBERG, NIST-Boulder — Optical atomic clocks based on the $^1S_0-^3P_0$ transition in neutral Sr or Yb atoms confined to optical lattices are rapidly gathering momentum. Three different labs have published frequency measurements of Sr based standards that agree to 1 part in 10^{14}, and several clocks based on Yb are being built around the world. We present recent progress at NIST on an Yb optical clock. This clock utilizes a moderate ($\sim$1 mT) external magnetic field to (weakly) allow the clock transition at 578 nm in an even isotope of Yb. We have observed very narrow ($\sim$4 Hz) spectroscopic lines, measured the Stark-free lattice wavelength (759.355+/-0.001 nm), and have made comparisons against other optical frequency standards. In addition, we present investigations on the effect of lattice polarization on clock frequency shifts. We also describe the development a new laser source for the clock transition. This solid state laser system uses sum frequency generation of a 1319 nm Nd:YAG and a 1030 nm fiber laser to generate the 578nm clock light.

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