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**Controlling higher-order Stark effects in an Yb optical lattice clock** W.F. MCGREW, N.B. PHILLIPS, K. BELOY, N. HINKLEY, M. SCHIOPPO, J.A. SHERMAN, T.H. YOON, C.W. OATES, A.D. LUDLOW, NIST, TIME AND FREQUENCY DIVISION TEAM — Recently, optical lattice clocks have demonstrated fractional frequency stability at the $10^{-18}$ level. Agreement between two Sr clocks has been observed at $-1.1 \pm 1.6 \times 10^{-18}$ [I. Ushijima *et al.*, arXiv:1405.4071 (2014)], with estimates of total uncertainty at similar levels. For the NIST Yb optical lattice clock, we have begun an experimental evaluation of all systematic uncertainties. The blackbody Stark shift - until recently the leading source of uncertainty - is controlled with a room-temperature radiative thermal shield to a fractional clock uncertainty of $1 \times 10^{-18}$. The next most significant effect is due to the optical lattice itself. We used a power-enhancement cavity to study the shift for both deep and shallow lattices with diverse thermal occupations. Hyperpolarizability effects can be significant at this level, and are precisely measured. Scalar Stark and hyperpolarizability lattice effects can be canceled to maintain total lattice shifts at $< 10^{-17}$. We also report experimental measurements of the Stark shifts due to the probe laser field and stray static electric fields.

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