Optical Dipole Trapping of Holmium

CHRISTOPHER YIP, University of Wisconsin - Madison, DONALD BOOTH, Argonne National Laboratory, HUAXIA ZHOU, University of Wisconsin - Madison, JEFFREY COLLETT, Lawrence University, MARK SAFFMAN, University of Wisconsin - Madison — Neutral Holmium's 128 ground hyperfine states, the most of any non-radioactive element, is a testbed for quantum control of a very high dimensional Hilbert space, and offers a promising platform for quantum computing. Its high magnetic moment also makes magnetic trapping a potentially viable alternative to optical trapping. Previously we have cooled Holmium atoms in a MOT on a 410.5 nm transition, characterized its Rydberg spectra, and made measurements of the dynamic scalar and tensor polarizabilities. We report here on progress towards narrow line cooling and magnetic trapping of single atoms.

1This research was supported by NSF award PHY-1707854.
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Date submitted: 31 Jan 2019    Electronic form version 1.4