

Abstract Submitted  
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**Optical Dipole Trapping of Holmium**<sup>1</sup> CHRISTOPHER YIP, University of Wisconsin - Madison, DONALD BOOTH<sup>2</sup>, Argonne National Laboratory, HUAXIA ZHOU, University of Wisconsin - Madison, JEFFREY COLLETT<sup>3</sup>, Lawrence University, MARK SAFFMAN<sup>4</sup>, 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.

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<sup>2</sup>Present address: Argonne National Laboratory, Lemont, IL 60439

<sup>3</sup>Permanent address: Department of Physics, Lawrence University, Appleton, Wisconsin 54911

<sup>4</sup>Department of Physics, University of Wisconsin-Madison, Madison, Wisconsin 53706

Chris Yip  
University of Wisconsin - Madison

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