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Narrow-line cooling of neutral Holmium[1] WILLIAM MILNER, CHRISTOPHER YIP, DONALD BOOTH, MARK SAFFMAN, University of Wisconsin-Madison — Neutral Holmiums 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. Previously we have cooled Holmium atoms in a MOT on a 410.5 nm transition with a Doppler temperature of 780 μK and characterized its Rydberg spectra. Following these past results, we are currently working towards narrow-line cooling on a 412 nm line with a Doppler temperature of 55 μK, allowing colder MOT temperatures. We have experimentally determined the excited state hyperfine constants of this transition and will present progress towards cooling on the F = 11 to F' = 12 hyperfine transition of the 412 nm line.

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