Narrow-line cooling of neutral Holmium\textsuperscript{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 \( \mu \)K 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 \( \mu \)K, 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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