Abstract Submitted
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Multi-photon sub-Doppler laser cooling ROGER BROWN, SAIJUN WU, WILLIAM PHILLIPS, J. V. PORTO, Joint Quantum Institute, University of Maryland and NIST, JOINT QUANTUM INSTITUTE, UNIVERSITY OF MARYLAND AND NIST TEAM — Nearly all quantum gas experiments utilize magneto-optical trapping and subsequent sub-Doppler laser cooling stages. Following the demonstration of a multi-color multi-photon magneto-optical trap for Cesium [1], we study multi-photon sub-Doppler laser cooling in two configurations. In the first configuration, the ground to excited state coupling light is near resonant to the transition while the excited to further excited state coupling light is scanned over a wide range through two-photon resonance. In the second configuration, the ground to excited state coupling light is far red detuned from the transition while the excited to further excited state coupling light is scanned through two-photon resonance. In both cases, we observe sub-Doppler cooling which we attribute to a 2-color polarization gradient cooling mechanism. We support our observations with detailed numerical simulations.

[1] Wu et al. PRL 103, 173003 (2009)

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