Abstract Submitted
for the DAMOP10 Meeting of
The American Physical Society

Narrow linewidth cooling of ^{6}Li[1] P.M. DUARTE, T.A. CORCOVILOS, J.M. HITCHCOCK, R.G. HULET, Department of Physics and Astronomy and Rice Quantum Institute, Rice University — We present progress toward the realization of narrow linewidth laser cooling on the $2S_{1/2} \rightarrow 3P_{3/2}$ transition of ^{6}Li at 323 nm. Laser cooling on the D2 transition of ^{6}Li at 671 nm is limited to 140 μK due to the 5.9 MHz transition linewidth. The 323 nm UV transition has a linewidth of 150 kHz, reducing the Doppler limit of laser cooling to 20 μK, still above but comparable to the recoil limit of 15 μK. We expect that implementing a stage of UV laser cooling after our 671 nm magneto-optical trap will enhance the phase-space density of the gas by a factor of 20. This will allow efficient loading to a moderately deep (700 μK) optical trap/lattice directly after laser cooling without the need of an additional deeper optical trap between the MOT and lattice stages, in contrast with other all-optical ^{6}Li experiments.

[1]Supported by NSF, ONR, DARPA, and the Welch and Keck Foundations.

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Date submitted: 25 Jan 2010 Electronic form version 1.4