Sideband Cooling of Neutral Atoms in a Far-Detuned Optical Lattice

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Sideband laser cooling using stimulated Raman transitions is performed on trapped cesium atoms. The confinement is produced by a far off-resonance dipole trap consisting of two crossed YAG beams which, by interference, create a one-dimensional optical lattice. In a pure intensity lattice, we measure a 1D-temperature of $T = 1.8$ μK corresponding to a mean quantum vibrational number of about $< n_v >= 0.1$. In a polarization gradient lattice, the final temperature is $T = 3.6$ μK corresponding to $< n_v > \simeq 2.4$.