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Raman Cooling Quasimomentum in an Optical Lattice DAVID CHEN, CAROLYN MELDGIN, BRIAN DEMARCO, Univ of Illinois - Urbana —
In optical lattice experiments, achieving lower temperatures would enable new possibilities for the study of strongly correlated physics, such as quantum magnetism and potentially the analog of d-wave superconductivity in the cuprates. We have developed a novel method for cooling the quasimomentum distribution of an ultracold gas trapped in an optical lattice that can operate with any atomic species. Entropy is removed from the gas by ejecting the most energetic atoms via quasimomentum-selective stimulated Raman transitions. We present evidence of cooling in a proof-of-principle experiment and we discuss prospects for improving this technique.

David Chen
Univ of Illinois - Urbana

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