DAMOP10-2010-020090

Abstract for an Invited Paper
for the DAMOP10 Meeting of
the American Physical Society

Ultracold ground state molecules in an optical lattice

HANNS-CHRISTOPH NÄGERL, University of Innsbruck and Austrian Academy of Science

We produce ultracold and dense samples of rovibrational ground state (RGS) molecules near quantum degeneracy. We first associate dimer molecules out of a lattice-based Mott-insulator state loaded from an atomic BEC and then coherently transfer the molecules to the RGS by a multiphoton STIRAP process. With an overall efficiency of 50%, we prepare a molecular quantum gas state in which every second site of an optical lattice is occupied with a RGS molecule.[1] We expect that, with further optimization of the transfer procedure, a BEC of RGS molecules is possible.

[1]An ultracold, high-density sample of rovibronic ground-state molecules in an optical lattice, J.G. Danzl et al., arXiv:0909.4700 (2009), to appear in Nature Physics.