Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Using an optical lattice to preform KRb molecules and enhance the efficiency of ultracold polar molecule formation[1] JAMES FREERICKS, Georgetown University, MACIEJ MASKA, University of Silesia, ROMUALD LEMANSKI, Institute for Low Temperature and Structure Research, THOMAS HANNA, National Institute of Standards and Technology, PAUL JULIENNE, Joint Quantum Institute of the University of maryland and the National Institute of Standards and Technology — We will discuss recent computational work that employs both direct quantum Monte Carlo simulation and inhomogeneous dynamical mean-field theory to study the efficiency of preforming KRb pairs in an optical lattice. We will describe how to optimize the efficiency by adjusting the lattice depth and the interspecies interaction (via the Feshbach resonance) with parameters specific for fermionic ^{40}K and bosonic ^{87}Rb (since the ground-state dipolar molecule has already been formed from those atoms in free space). We work with a deep enough lattice that the K atoms are mobile, but the Rb atoms are localized, so the system is described by the spinless Falicov-Kimball model on a two-dimensional lattice. We also calculate the entropy and estimate the temperature that one can achieve by cooling the atoms and adiabatically turning on the lattice.

[1]Supported under ARO Award W911NF0710576 with funds from the DARPA OLE Program.

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Date submitted: 21 Nov 2008 Electronic form version 1.4