Abstract Submitted
for the DAMOP14 Meeting of
The American Physical Society

Coherent evolution of a BEC quenched to unitarity JOHN CORSON, ANDREW SYKES, JOSE D'INCAO, ANDREW KOLLER, JILA, NIST, and the University of Colorado, Boulder, CHRIS GREENE, Purdue University, ANA MARIA REY, KADEN HAZZARD, JOHN BOHN, JILA, NIST, and the University of Colorado, Boulder — Following recent experimental results [1], we theoretically study the coherent time evolution of a zero-temperature BEC whose scattering length is quenched suddenly towards unitarity. Despite the resonant atom-atom interactions, the condensate does not deplete instantaneously, and this allows us to describe the short-time behavior with a mean-field-like, many-body variational wavefunction. We compute the dynamics of various observables such as the momentum distribution, Tan's contact, density-density correlations, and the final Feshbach molecule fraction (after quenching back to finite scattering length for imaging). The nonequilibrium behavior of the momentum distribution suggests the presence of unexpected subleading terms that are absent in equilibrium.

[1] P. Makotyn, et al, Nat. Phys. **10**, 116 (2014).

John Corson
JILA, NIST, and the University of Colorado, Boulder

Date submitted: 31 Jan 2014 Electronic form version 1.4