

Abstract Submitted  
for the DAMOP07 Meeting of  
The American Physical Society

**Bose-Condensed  $^7\text{Li}$  in a Random Potential**<sup>1</sup> JAMES HITCHCOCK, Y.P. CHEN, M. JUNKER, D. DRIES, C. WELFORD, R.G. HULET, Rice University Physics and Astronomy — Imposing a random potential on a Bose-Einstein condensate (BEC) of  $^7\text{Li}$  creates a unique system for studying superfluid behavior in the presence of disorder. We generate a random optical potential by passing a 1  $\mu\text{m}$  laser through a ground glass diffuser. The resulting laser speckle pattern is then overlapped with the probe beam and projected onto the atoms. This setup allows for almost simultaneous imaging of the atomic cloud and the random potential. Parameters such as the disorder strength and disorder correlation length can be precisely characterized. We can control the disorder strength by varying the laser intensity and the atomic interaction (scattering length) via a Feshbach resonance. We have investigated the effects of disorder on dipole oscillation in a harmonic trap, and time of flight expansion of the BEC. This system has allowed us to study such phenomena as quantum phase fluctuations, localization and interplay between interaction and disorder.

<sup>1</sup>Supported by NSF, ONR, and the Welch and Keck Foundations.

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Date submitted: 03 Feb 2007

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