Abstract Submitted
for the DAMOP11 Meeting of
The American Physical Society

Onset of thermalization in a 1D Bose gas JEAN-FELIX RIOU, AARON W. REINHARD, LAURA ADAMS, DAVID S. WEISS, Penn State University — There has been considerable theoretical debate about how nearly integrable many-body quantum systems approach thermal equilibrium. Experiments on one dimensional Bose gases in optical lattices may shed light on this issue. We have studied the time evolution of momentum distributions of Rb clouds initially prepared in "quantum Newton's cradle" states [T. Kinoshita, T. Wenger and David S. Weiss, "A quantum Newton's Cradle," Nature 440, 900 (2006)]. The measured evolution rates are found to depend on density and lattice depth. In order to isolate the part of the approach to equilibrium due to atom-atom interactions, it has been necessary to quantify, experimentally and theoretically, the contributions of various heating and loss processes to these rates.

Jean-Felix Riou
Penn State University

Date submitted: 08 Feb 2011 Electronic form version 1.4