Abstract Submitted
for the DAMOP16 Meeting of
The American Physical Society

Observation of Dynamical Fermionization in 1D Bose Gases NEEL MALVANIA, LIN XIA, WEI XU, JOSHUA M. WILSON, LAURA A. ZUNDEL, MARCOS RIGOL, DAVID S. WEISS, Department of Physics, The Pennsylvania State University, University Park, PA 16802 — The momentum distribution of a harmonically trapped 1D Bose gases in the Tonks-Girardeau limit is expected to undergo dynamical fermionization [1]. That is, after the harmonic trap is suddenly turned off, the momentum distribution steadily transforms into that of an ideal Fermi gas in the same initial trap. We measure 1D momentum distributions at variable times after such a quench, and observe the predicted dynamical fermionization. In addition to working in the strong coupling limit, we also perform the experiment with intermediate coupling, where theoretical calculations are more challenging. [1] M. Rigol, A. Muramatsu, PRL 94, 240403 (2005); A. Minguzzi, D. M. Gangardt, PRL 94, 240404 (2005).

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Date submitted: 29 Jan 2016 Electronic form version 1.4