

Abstract Submitted  
for the DAMOP13 Meeting of  
The American Physical Society

**Spin-Imbalanced Fermi Gases from 1D to 3D**<sup>1</sup> BEN A. OLSEN, MELISSA REVELLE, RANDALL G. HULET, Department of Physics and Astronomy and Rice Quantum Institute, Rice University, Houston, TX 77005 — A spin-imbalanced Fermi gas confined to 1D tubes using a 2D optical lattice exhibits phase separation; a partially polarized superfluid core adjoins fully polarized or fully paired wings in each 1D tube, depending on the overall spin polarization<sup>2</sup>. By decreasing the strength of the optical lattice, we vary the tunneling rate between the tubes and decrease the cloud's 1D character. In the absence of a lattice, the 3D cloud separates into a fully paired core surrounded by excess unpaired spins<sup>3</sup>. We report investigations of the spin density in spin-imbalanced Fermi gases confined in a range of lattice depths such that the character of the gas varies from 1D to 3D.

<sup>1</sup>Supported by DARPA, NSF, and ONR

<sup>2</sup>Y.A. Liao et al., Nature 467, 567 (2010)

<sup>3</sup>G. B. Partridge et al., Science 311, 503 (2006); Y. Shin et al., Phys. Rev. Lett. 97, 030401 (2006)

Ben A. Olsen  
Department of Physics and Astronomy and Rice Quantum Institute,  
Rice University, Houston, TX 77005

Date submitted: 28 Jan 2013

Electronic form version 1.4