

Abstract Submitted
for the DAMOP09 Meeting of
The American Physical Society

Investigation of the 3D to 1D Crossover of a Spin- Imbalanced Fermi Gas¹ TOBIAS PAPROTTA, YEAN-AN LIAO, WENHUI LI, ANN SOPHIE C. RITTNER, RANDALL G. HULET, Department of Physics and Astronomy and Rice Quantum Institute, Rice University, Houston, TX 77005 — Spin-imbalanced Fermi gases have been investigated in 3D geometries, for which phase separation into normal and superfluid phases has been observed². We have implemented a 2D optical lattice, which produces an array of 1D tubes with weak axial confinement and have begun to map out the phase diagram for the imbalanced Fermi gas in 1D. Theory predicts an inverted spatial position of the unpolarized superfluid relative to 3D, occupying the trap edges rather than the trap center³. We investigate this crossover by tuning lattice depth, which smoothly modifies the inter-tube tunneling.

¹Supported by DARPA, NSF, ONR, the Keck and Welch Foundations.

²G. B. Partridge et al., Science 311, 503-505 (2006); C.H. Schunck et al., Science 316, 867-870 (2007).

³G. Orso, Phys. Rev. Lett. 98, 070402 (2007); H. Hu et. al, Phys. Rev. Lett. 98, 070403 (2007).

Tobias Paprotta
Dept of Physics and Astronomy and Rice Quantum Institute,
Rice University, Houston, TX 77005

Date submitted: 23 Jan 2009

Electronic form version 1.4