

Abstract Submitted
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The 1D-3D Crossover of A Spin-Imbalanced Fermi Gas¹ MELISSA REVELLE, BEN A. OLSEN, YEAN-AN LIAO, RANDALL G. HULET, Department of Physics and Astronomy and Rice Quantum Institute, Rice University, Houston, TX 77005 — We have previously mapped the phase diagram of a 1D spin-imbalanced Fermi gas by confining lithium atoms in an array of tubes using a 2D optical lattice.² Within each tube we observed separation of the atoms into a partially polarized superfluid core and fully paired or fully polarized wings (depending on the spin polarization) In 3D, the phase separation is inverted, such that the cloud center is fully paired.³ We investigate the transition from a 1D to 3D gas by reducing the lattice depth in order to change the tunneling between the tubes. The dynamics of spin transport may be investigated by a sudden change in lattice depth.

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²Y.A. Liao et al., Nature 467, 567 (2010).

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

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