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Quasi-1D Fermi Gases with Spin Imbalance¹ BEN A. OLSEN, MELISSA REVELLE, RANDALL G. HULET, Department of Physics and Astronomy and Rice Quantum Institute, Rice University, Houston, TX 77005 — We report investigations of the spin density in spin-imbalanced Fermi gases confined to 1D tubes using a 2D optical lattice. Measurements of density profiles along the tubes reveal phase transitions between partially polarized superfluid cores and either ferromagnetic or BCS-like wings.² Variations of these phase boundaries with temperature can reveal quantum critical behavior.³ Weak tunneling between the tubes should stabilize long-range ordering in the gas, increasing the chance of observing FFLO physics.⁴

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

³X.W. Guan and T.-L. Ho, PRA 84, 023616 (2011)

⁴M. M. Parish et al., PRL 99, 250403 (2007)

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