

Abstract Submitted  
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**Detecting The FFLO Phase In The Dimensional Crossover Of An Imbalanced FERMI Gas**<sup>1</sup> YI JIN, JACOB FRY, ANNA MARCHANT, MELISSA REVELLE, RANDALL HULET, Department of Physics and Astronomy and Rice Center for Quantum Materials, Rice University, Houston, TX 77005 — The exotic Fulde-Ferrell-Larkin-Ovchinnikov (FFLO) magnetized superconductor occupies a large region of the one-dimensional (1D) phase diagram. However, the FFLO phase is more robust against quantum and thermal fluctuations in higher dimensions. This motivated us to map the dimensional crossover between 1D and 3D<sup>2</sup>, as it is predicted to be the optimal regime to search for FFLO<sup>3</sup>. We prepare a spin-imbalanced Fermi gas of <sup>6</sup>Li, analogous to creating a magnetized atomic cloud. By using a 2D optical lattice, we confine the atoms to 1D tubes and bring the system to the dimensional crossover regime by tuning the inter-tube tunneling rate and interaction strength. To detect FFLO, we take 1D time of flight measurements using a blue-detuned anti-trapping beam to cancel the axial confinement. This permits the mapping of the linear momentum distribution, from which signatures of FFLO may be observed.

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<sup>2</sup>M. C. Revelle et al. Phys. Rev. Lett. 117, 235301 (2016).

<sup>3</sup>M. M. Parish et al. Phys. Rev. Lett. 99, 250403 (2007).

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