

Abstract Submitted
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Radiofrequency Spectroscopy and Thermodynamics of Fermi Gases in the 2D to Quasi-2D Dimensional Crossover¹ CHINGYUN CHENG, Duke University, North Carolina State University, JAYAMPATHI KANGARA, ILYA ARAKELYAN, JOHN THOMAS, North Carolina State University — We tune the dimensionality of a strongly interacting degenerate ${}^6\text{Li}$ Fermi gas from 2D to quasi-2D, by adjusting the radial confinement of pancake-shaped clouds to control the radial chemical potential. In the 2D regime with weak radial confinement, the measured pair binding energies are in agreement with 2D-BCS mean field theory, which predicts dimer pairing energies in the many-body regime. In the quasi-2D regime obtained with increased radial confinement, the measured pairing energy deviates significantly from 2D-BCS theory. In contrast to the pairing energy, the measured radii of the cloud profiles are not fit by 2D-BCS theory in either the 2D or quasi-2D regimes, but are fit in both regimes by a beyond mean field polaron-model of the free energy.

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