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The normal state of a strongly interacting two-dimensional Fermi gas PUNEET A MURTHY, Heidelberg University, IGOR BOETTCHER, Simon Fraser University, RALF KLEMT, MARVIN HOLTEN, GERHARD ZÜRN, TILMAN ENSS, MATHIAS NEIDIG, PHILIPP PREISS, SELIM JOCHIM, Heidelberg University — We explore the normal phase of a strongly interacting two-dimensional Fermi gas in the BEC-BCS crossover. We use spatially resolved RF spectroscopy to measure the homogeneous response of the system for a wide range of temperatures and interaction strengths. We observe the formation of two-body dimers at high temperatures. At lower temperatures close to the superfluid critical temperatures, we find that the RF spectra show large density-dependent deviations from the dimer binding energy. Whereas pairing on the BEC side can be explained by two-body physics, we observe that the pair formation in the strongly interacting crossover regime is a many-body phenomena. Surprisingly, our analysis of the density-dependent shifts suggests that the physics across the entire crossover can be captured in a mean-field picture.

Puneet Anantha Murthy
Heidelberg University

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