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Abstract for an Invited Paper
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A strongly interacting two-dimensional Fermi gas

SELIM JOCHIM, Heidelberg University

We will present our progress realizing two-dimensional superfluids with ultracold fermionic lithium atoms confined in a quasi two-dimensional potential. In this setting, a generic two-dimensional Fermi gas is realized with interactions tunable to any value within the short-range limit. We measured the phase diagram for this system and found the coherence properties to be decaying algebraically, a signature of the Beresinskii-Kosterlitz-Thouless phase which is expected for a homogeneous two-dimensional superfluid. We furthermore extracted from our data the equation of state, which will be an important benchmark for many body theories. We are currently working to transfer our fermionic atoms into an optical lattice potential. Our vision to realize exotic superfluidity in this system will be discussed.