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Progress Towards Spectroscopy of Pairs in the Attractive Fermi-Hubbard Model WENCHAO XU, WILLIAM MORONG, BRIAN DEMARCO, University of Illinois at Urbana-Champaign — The capability to tune inter-particle interactions via a Feshbach resonance makes ultracold fermionic atoms trapped in optical lattices an ideal platform to study the attractive Fermi Hubbard model, which is difficult to realize in conventional solid-state systems. Theory indicates that pairs can form in the lattice with a coherence length controlled by the interaction strength. As the coherence length becomes comparable to lattice spacing, a crossover between BCS-like pairing and a BEC-like bound state occurs. We present progress on spectroscopy measurements of the pair binding energy in the BEC-BCS crossover regime and compare with theory. We discuss how we can use an optical speckle potential to study the effect of disorder on the pair spectrum, which has not been fully resolved by current theoretical approaches.

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