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Photoemission spectroscopy of a Fermi-Hubbard system with a quantum gas microscope[1] PETER T. BROWN, ELMER GUARDADO-SANCHEZ, BENJAMIN M. SPAR, WASEEM S. BAKR, Princeton University — Strongly correlated systems with superconducting ground states, including the high-temperature superconducting cuprates and the unitary fermi gas, exhibit normal state precursors to the superconducting gap in their single-particle excitations. A quantitative understanding of these so called pseudogap regimes may elucidate details about the superconducting ground states, but developing this is difficult in real materials partly because the parameters of the microscopic Hamiltonian are not known. In cold atom experiments the development of fermionic quantum gas microscopes has enabled high-precision studies of fermions in optical lattices. The Hamiltonian parameters of these systems can be calculated from first principles, and consequently good agreement between theory and experiment has been reported in recent studies of equal-time spin and density correlations. In this talk I will report on the development of angle-resolved photoemission spectroscopy (ARPES) compatible with quantum gas microscopy and its application to studying pseudogap physics in an attractive Fermi-Hubbard system across the BEC-BCS crossover, setting the stage for future studies of the pseudogap regime in repulsive Hubbard systems.

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