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Site-resolved measurement of spin correlations for fermions in an optical lattice MAXWELL PARSONS, ANTON MAZURENKO, CHRISTIE CHIU, GEOFFREY JI, DANIEL GREIF, MARKUS GREINER, Harvard Univ — The recent demonstrations of site-resolved imaging of fermionic atoms in an optical lattice enable local measurements of charge correlations in Fermi lattice systems. Access to local spin correlations, however, has not yet been demonstrated. Measuring spin correlations is of particular interest because in the repulsive 2D Hubbard model, away from half-filling, the interplay of the spin and charge degrees of freedom is expected to give rise to pseudo-gap physics and perhaps d-wave superconductivity, but this doped regime is difficult to describe with current theoretical techniques. In this talk, I describe a new method for locally measuring spin correlations with our Fermi Gas Microscope. We observe nearest-neighbor AFM correlations in a two-component mixture of fermionic lithium atoms in a 2D optical lattice. The ability to measure trap-resolved magnetic correlations will allow us to explore entropy redistribution schemes, and may provide a way to access the low-temperature phases of the Hubbard model using ultracold atoms.

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