

Abstract Submitted
for the DAMOP17 Meeting of
The American Physical Society

Observation of charge density wave correlations in the attractive Fermi-Hubbard model DEBAYAN MITRA, PETER BROWN, ELMER GUARDADO-SANCHEZ, PETER SCHAUSS, WASEEM BAKR, Princeton University — The attractive Hubbard model is the simplest condensed matter model that gives rise to conventional superfluidity in a lattice. At half-filling, the ground state of the model has degenerate superfluid and charge density wave orders. Using quantum gas microscopy of fermionic lithium in an optical lattice, we detect charge-density wave correlations in attractive gases prepared either on the upper or lower branch of a Feshbach resonance. Away from half-filling, the correlations get weaker as the system favors superfluid order. These correlations serve as a low-temperature thermometer and are an indirect way to measure the strength of superfluid correlations in the gas. Our characterization of the entropy of spin-balanced attractive gases in lattices sets the stage for searching for signatures of non-zero momentum superfluids in spin-imbalanced lattice gases.

Debayan Mitra
Princeton University

Date submitted: 27 Jan 2017

Electronic form version 1.4