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Few-body interactions in a Fermi degenerate optical lattice clock[1]

G. EDWARD MARTI, AKIHISA GOBAN, ROSS HUTSON, SARA CAMPBELL, JUN YE, JILA, NIST, University of Colorado, Boulder — Alkaline-earth-like atoms trapped in optical lattices are at the forefront of both precision measurements, realizing record accuracy as an optical frequency standard, and quantum simulations. Recent advances have sought to use precision spectroscopy on the millihertz-linewidth optical transition to study many-body physics, including the discovery of an interorbital Feshbach resonance, demonstration of spin-orbit coupling, and the realization of a Fermi-degenerate 3D optical lattice clock. In this talk, I will discuss our recent work on resolving few-body interactions of SU(N) fermionic strontium in deep optical lattices with narrow-line optical spectroscopy. By combining spectroscopy with imaging, we can resolve the spatial structure of interacting atoms in a degenerate Fermi gas.

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