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HARVARD Quantum Optics Center

INSTITUTE FOR THEORETICAL ATOMIC, MOLECULAR AND OPTICAL PHYSICS
at the Harvard-Smithsonian Center for Astrophysics and Harvard Physics Department, Cambridge MA USA

Joint Quantum Sciences Seminar

Wednesday | Oct. 17 | 4:00 pm
Jefferson 250

Randall Hulet

Professor, Rice University

"Ultracold Atomic Fermions in Optical Lattices"

We cool the lithium fermionic isotope ^{6}Li to quantum degeneracy and confine the atoms in an optical lattice formed by retroreflected laser beams. I will discuss two experiments using two hyperfine sublevels as a pseudo-spin-½ system. In the first, we obtain the phase diagram of a spin-imbalanced gas in one dimension with strong interparticle interaction. This system is predicted to exhibit an exotic pairing mechanism, known as the "FFLO" state (after its proposers). In the second, we employ a 3D simple cubic optical lattice to realize the Fermi-Hubbard model of condensed matter physics. This model, which has been proposed as a model of high-temperature superconductors, exhibits antiferromagnetic order when the lattice is half filled.

Student Presentation by Philip Preiss, Greiner Lab
"Imaging and Manipulating a Bilayer Quantum Gas "

Student Presentation will begin promptly at 4:00 PM
Guest Presentation will begin promptly at 4:30 PM