Towards exploring new quantum materials with degenerate Ytterbium atoms

By
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Host: Asst Prof Lan Shau-Yu

Abstract
Quantum materials exhibiting collective and emergent phenomena are of central interest in modern quantum and material science. As an example, ultracold atomic system provides an ideal test bed simulating and testing the ground state of many-body Hamiltonians in a controlled manner. In this talk, I will discuss ongoing experimental efforts at HKUST (The Hong Kong University of Science and Technology) to implement Ytterbium Fermi gases under the high-resolution optical microscope. Fermionic ytterbium atoms exhibit complex internal structure with SU(N<=6) spin symmetry as the electronic spin is effectively decoupled from the nuclear spin. The SU(N) spin symmetry offers a unique opportunity to explore a new class of the many-body problems due to the N-fold degeneracy. I will share our recent developments and plans for investigating the nature of interacting Ytterbium Fermi gases with various settings both in weakly and strongly interacting regime.

Short Biography
Prof. Jo did his Ph.D at MIT with Wolfgang Ketterle and postdoc at UC Berkeley with Dan Stamper-Kurn working on ultra-cold quantum gas. His research interests focus on quantum simulation of strongly correlated materials using ultracold atoms, quantum synthetic materials and quantum magnetism, novel optical superlattices, atom optics and atom interferometry, and ultracold Fermi gases and Bose-Einstein condensates.