

**Quantum Simulation Using Two-electron Atoms in an Optical Lattice**

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In this talk, I will report our recent experiments using ultracold two-electron atoms of ytterbium (Yb) loaded into an optical lattice. One of the unique properties of Fermi gases of two-electron atoms is a high spin symmetry of  $SU(N=2I+1)$  of nuclear spin  $I$ , which is expected to show novel quantum magnetism. By using a  $^{173}\text{Yb}$  Fermi gas with  $SU(6)$  symmetry, we successfully measure nearest-neighbor antiferromagnetic spin correlations in various lattice geometries owing to an enhanced Pomeranchuk cooling effect [1]. We will also report experiments on the quantum simulation of the Kondo effect [2] and dynamics of the dissipative quantum many-body system.

References:

[1] H. Ozawa, et al, PRL121, 225303(2018).

[2] K. Ono, et al, PRA 99, 032707(2019).