

Abstract Submitted  
for the DAMOP17 Meeting of  
The American Physical Society

**Inter-orbital interactions in state-dependent optical lattices** LUIS RIEGGER, NELSON DARKWAH OPPONG, MORITZ HOEFER, IMMANUEL BLOCH, SIMON FOELLING, LMU, Munich, Germany; MPQ, Garching, Germany — We report on the realization of a state-dependent optical lattice for the ground state  $^1S_0$  and metastable excited state  $^3P_0$  of fermionic  $^{173}\text{Yb}$ . While excited-state atoms are pinned by the lattice, ground-state atoms retain their mobility. Moreover, the optical lattice is nuclear-spin independent, conserving the  $SU(N)$  symmetry of the interactions, typical for earth-alkaline-like atoms. Together, these features make it a natural platform for the realization of Kondo-type physics. The effective inter-orbital interactions are influenced by the recently discovered magnetic Feshbach resonance as well as the lattice potential, inducing mixed dimensionality for the two atomic orbitals. We probe these interactions experimentally using high-resolution clock-line spectroscopy as well as collision dynamics.

Luis Riegger  
LMU, Munich, Germany; MPQ, Garching, Germany

Date submitted: 27 Jan 2017

Electronic form version 1.4