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Interorbital interactions in Ytterbium-171 OSCAR BETTERMANN, NELSON DARKWAH OPPONG, GIULIO PASQUALETTI, LUIS RIEGGER, IMMANUEL BLOCH, SIMON FOELLING, LMU, Munich, Germany; MPQ, Garching, Germany — Being an alkaline-earth-like atom, Ytterbium features a metastable state, the so-called clock state. This, in conjunction with state-dependent lattices, is a key feature for the realization of two-orbital Hamiltonians such as Kondo-type systems. In our experiment, we investigate the interorbital scattering properties of Ytterbium-171 atoms using clock-line spectroscopy, as well as the lifetime of the interacting states in a three-dimensional optical lattice. For this isotope, we find the interorbital spin-exchange interaction to be antiferromagnetic. We also observe long lifetimes of the interacting states in the lattice, which should be a good starting point for many-body physics with these atoms. This finding complements the known ferromagnetic exchange in Ytterbium-173, which should make both types of spin-exchange interactions available for two-orbital magnetic hamiltonians such as the Kondo model or the Kondo lattice model.

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