Abstract Submitted
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Spin-orbit coupling in ultracold Fermi gases of ^{173}Yb atoms[1] BO SONG, CHENGDONG HE, ELNUR HAJIYEV, ZEJIAN REN, BOJEONG SEO, GEYUE CAI, DOVRAN AMANOV, SHANCHAO ZHANG, GYU-BOONG JO, Hong Kong Univ of Sci & Tech — Synthetic spin-orbit coupling (SOC) in cold atoms opens an intriguing new way to probe nontrivial topological orders beyond natural conditions. Here, we report the realization of the SOC physics both in a bulk system and in an optical lattice. First, we demonstrate two hallmarks induced from SOC in a bulk system, spin dephasing in the Rabi oscillation and asymmetric atomic distribution in the momentum space respectively. Then we describe the observation of non-trivial spin textures and the determination of the topological phase transition in a spin-dependent optical lattice dressed by the periodic Raman field. Furthermore, we discuss the quench dynamics between topological and trivial states by suddenly changing the band topology. Our work paves a new way to study non-equilibrium topological states in a controlled manner.

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