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Observation of topological states in an optical Raman lattice with ultracold fermions[1] BO SONG, CHENGDONG HE, Hong Kong Univ of Sci & Tech, LONG ZHANG, TING FUNG JEFFREY POON, Peking University, ELNUR HAJIYEV, ZEJIAN REN, BOJEONG SEO, SHANCHAO ZHANG, Hong Kong Univ of Sci & Tech, XIONG-JUN LIU, Peking University, GYU-BOONG JO, Hong Kong Univ of Sci & Tech — The spin-orbit coupling with cold atoms, especially in optical lattices, provides a versatile platform to investigate the intriguing topological matters. In this talk, we will present the realization of one-dimensional spin-dependent lattice dressed by the periodic Raman field. Ultracold ^{173}Yb fermions loaded into an optical Raman lattice reveal non-trivial spin textures due to the band topology, by which we measured topological invariants and determined a topological phase transition. In addition, we explored the non-equilibrium quench dynamics between the topological and the trivial states by suddenly changing the band topology of the optical Raman lattice. The optical Raman lattice demonstrated here opens a new avenue to study the spin-orbit coupling physics and furthermore to realize novel quantum matters such as symmetry-protected topological states.

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Bo Song
Hong Kong Univ of Sci & Tech

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