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Anderson Localization of a non-interacting Bose-Einstein condensate with effective spin-orbit interaction in a quasiperiodic optical lattice<sup>1</sup> LU ZHOU, Department of Physics, East China Normal University, HAN PU, Department of Physics and Astronomy, Rice University, WEIPING ZHANG, Department of Physics, East China Normal University — We theoretically investigate the localization properties of a noninteracting atomic Bose-Einstein condensate moving in a one-dimensional quasiperiodic optical lattice potential in the tight-binding regime. The atoms are subject to effective spin-orbit coupling induced by external laser fields. We present the phase diagram in the parameter space of the disorder strength and those related to the effective spin-orbit coupling. The phase diagram are verified via multifractal analysis of the atomic wavefunctions. We found that spin-orbit coupling can lead to the spectra mixing (coexistence of extended and localized states) and the appearance of mobility edges.

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Lu Zhou Department of Physics, East China Normal University

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