

Abstract Submitted
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Cold-atom systems with synthetic SU(3) spin-orbit coupling¹

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— Recently, the ability to create and control artificial gauge fields in cold gases has been experimentally demonstrated. Here, we propose a scheme to realize synthetic SU(3) spin-orbit interactions and derive an effective single-particle Hamiltonian, parameterized by the Gell-Mann matrices. We then investigate a many-body system of SU(3)-spin-orbit-coupled bosons and derive and analyze numerically the Gross-Pitaevskii equation to describe the effect of interaction on the possible ground states. The time-of-flight density profiles to probe various many-body states in the rich phase diagram of the system are calculated.

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