

Abstract Submitted
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P-orbital Condensations of Two-species Bose Mixture in Optical Lattice¹ JHIH-SHIH YOU, Department of Physics, National Tsing Hua Univ, I-KANG LIU, Department of Physics and Graduate Institute of Photonics, National Changhua University of Education, DAW-WEI WANG, Department of Physics, National Tsing Hua Univ, SHIH-CHUAN GOU, Department of Physics and Graduate Institute of Photonics, National Changhua University of Education, CONGJUN WU, Department of Physics, University of California, San Diego — We investigate the p -orbital Bose-Einstein condensations (BECs) of two-species mixture in a bipartite optical lattice. A new imaginary-time propagation method is developed to numerically solve the Gross-Pitaevskii equation with truncating states below the p bands, which can be applicable to even higher orbital bands. Our study confirms that the intra-species interactions favor complex time-reversal broken BECs with staggered orbital currents. However, when the inter-species interaction increases, the complex condensate state undergoes a quantum phase transition toward a real-valued TR invariant condensate with staggered spin density structure. We discuss the origin and properties of such phase transition and its implication in the experimental measurement.

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