

Abstract Submitted
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Inter-band coupling induced novel condensates in a double-well lattice¹ QI ZHOU, Joint Quantum Institute and Condensed Matter Theory Center, University of Maryland, JAMES V. PORTO, Joint Quantum Institute, University of Maryland, SANKAR DAS SARMA, Joint Quantum Institute and Condensed Matter Theory Center, University of Maryland — We predict novel inter-band physics for bosons in a double-well lattice. An intrinsic coupling between the s and px band due to interaction gives rise to larger Mott regions on the phase diagram at even fillings than the ones at odd fillings. On the other hand, the ground state can form various types of condensates, including a mixture of single-particle condensates of both bands, a mixture of a single-particle condensate of one band and a pair-condensate of the other band, and a pair-condensate composed of one particle from one band and one hole from the other band. The predicted phenomena should be observable in current experiments on double-well optical lattices.

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