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Interaction-driven quantum phase transitions of Bose condensates in shaken optical lattices LOGAN W. CLARK, LEI FENG, ANITA GAJ, BRANDON M. ANDERSON, K. LEVIN, CHENG CHIN, University of Chicago — Shaken optical lattices enable exciting opportunities to study exotic quantum many-body phases in ultracold atomic gases. An intriguing example occurs when shaking a Bose condensate in an optical lattice causes its dispersion to acquire new minima at non-zero quasi-momenta. In this case the condensate can undergo a quantum phase transition after which atoms occupy the new minima. Repulsive interactions cause atoms with different momentum to segregate into spatially-separated domains. Here, we will discuss the much richer phenomena which are enabled by the interactions occurring during the shaking period. These subtle interaction effects can favor new quantum phases which break additional symmetries that are otherwise present in the Hamiltonian.

Logan Clark
Univ of Chicago

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