

Abstract Submitted
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Chiral Mott insulator of kinetically frustrated bosons¹ ARUN PARAMEKANTI, University of Toronto, ARYA DHAR, Indian Institute of Astrophysics, MAHESWAR MAJI, Indian Institute of Science, TAPAN MISHRA, Indian Institute of Astrophysics, SUBROTO MUKERJEE, Indian Institute of Science, RAMESH PAI, Goa University — We study the phase diagram of the fully frustrated Bose Hubbard (FFBH) model - the presence of a π -flux through each plaquette leads to kinetic frustration for the bosons making this a nontrivial model of quantum frustration. The FFBH model is equivalent to a model of frustrated quantum XY spins, or a fully frustrated Josephson junction array where one tunes the ratio of the charging energy to the Josephson coupling. Using Monte Carlo simulations and DMRG calculations on a ladder, we show that the ground state of this model is, at intermediate correlations, a Chiral Mott insulator which supports staggered loop currents. We characterize this Mott phase as a vortex supersolid or an exciton condensate and discuss experimental observables and generalizations.

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