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Predicted quantum stripe ordering in optical lattices CONGJUN

WU, Kavli Institute for Theoretical Physics, University of California, Santa Barbara, California 93106, USA, W. VINCENT LIU, Department of Physics and Astronomy, University of Pittsburgh, Pittsburgh, Pennsylvania 15260, USA , JOEL MOORE, Department of Physics, University of California, Berkeley, California 94720, USA, SANKAR DAS SARMA, Condensed Matter Theory Center, Department of Physics, University of Maryland, College Park, Maryland 20742, USA — We predict the robust existence of a novel quantum orbital stripe order in the p - band Bose-Hubbard model of two-dimensional triangular optical lattices with cold bosonic atoms. An orbital angular momentum moment is formed on each site exhibiting a stripe order both in the superfluid and Mott-insulating phases. The stripe order spontaneously breaks time-reversal, lattice translation and rotation symmetries. In addition, it induces staggered plaquette bond currents in the superfluid phase. Possible signatures of this stripe order in the time of flight experiment are discussed.

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