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Correlated phases of bosons in tilted, frustrated lattices SUSANNE PIELAWA, TAKUYA KITAGAWA, EREZ BERG, SUBIR SACHDEV, Physics Department, Harvard University, Cambridge, MA 02138, USA — We theoretically study the 'tilting' of Mott insulators of bosons into metastable states, and show that there are rich possibilities for correlated phases with non-trivial entanglement of pseudospin degrees of freedom measuring the boson density. A previous study (Phys. Rev. B **66**, 075128 (2002)) examined Mott insulators on cubic lattices in 1, 2, or 3 spatial dimensions tilted along a principal cubic axis, and found quantum phases with Ising density wave order, and with superfluidity transverse to the tilt direction. The one-dimensional case has recently been realized experimentally by the Greiner group at Harvard. Here we examine a variety of lattice geometries and tilt directions in two dimensions: square, triangular, decorated square, and kagome. Frustration in these systems can be implemented by decorating the lattices. We find phases with density order, a sliding Luttinger liquid phase, and quantum liquid states with no broken symmetry; an exact liquid ground state is found for a particular correlated boson model. Reference: arXiv:1101.2897

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