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Supersolid Bosons on Frustrated Optical Lattices STEFAN WESSEL, Institute for Theoretical Physics III, University of Stuttgart, Germany, MATTHIAS TROYER, Institute for Theoretical Physics, ETH Zurich, Switzerland — We consider an ultra-cold Bose gas on a triangular optical lattice subject to nearest neighbor repulsion, and determine the phase diagram using quantum Monte Carlo simulations. Already in the hard-core limit the system is found to exhibit an extended supersolid phase emerging from an order-by-disorder effect as a novel way of a quantum system to avoid classical frustration. We analyze the nature of the supersolid phase and its stability in competition with phase-separation, which we find to occurs in other regions of parameter space. Possible experimental realizations of our scenario and extensions to other lattice geometries are discussed as well as the connection to the physics of frustated quantum antiferromagnets.

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