Abstract Submitted
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The realization of a tunable optical kagome lattice using ultracold atoms JENNIE GUZMAN, CLAIRE K. THOMAS, PAVAN HOSUR, THOMAS BARTER, GYU-BOONG JO, ASHVIN VISHWANATH, DAN M. STAMPER-KURN, University of California Berkeley — We report the realization of a two-dimensional kagome lattice for ultracold ^{87}Rb atoms by overlaying two commensurate triangular optical lattices generated by light at the wavelengths of 532 and 1064 nm. Stabilizing and tuning the relative position of the two triangular lattices, different lattice geometries including a kagome, a one-dimensional stripe, and a decorated triangular lattice are explored. We characterize these geometries using Kapitza-Dirac diffraction and by analyzing the Bloch-state composition of a superfluid released suddenly from the lattice. The tunable optical superlaatice implemented in this work offers a new way to investigate a possible superfluid (SF) to Mott insulator (MI) phase transition by tuning the lattice geometries with different number of nearest neighbors. In this poster, we report the experimental progress on the geometry-induced SF-MI phase transition between triangular and kagome lattice geometries.

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