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Finite temperature phase structures of hard-core bosons in an optical lattice with a synthetic magnetic field[1] KENICHI KASAMATSU, YUKI NAKANO, TETSUO MATSUI, Department of Physics, Kinki University — We study finite temperature phase structures of hard-core bosons in a two-dimensional optical lattice subject to a synthetic magnetic field by employing the gauged CP^1 model. Based on the extensive Monte Carlo simulations, we study their phase structures at finite temperatures for several values of the magnetic flux per plaquette of the lattice and mean particle density. Despite the presence of the particle number fluctuation, the thermodynamic properties are qualitatively similar to those of the frustrated XY model with only the phase as a dynamical variable.

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