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Quantum Phase Transitions of Hard-Core Bosons on the Kagome Lattice S. V. ISAKOV, University of Toronto, R. G. MELKO, Oak Ridge National Laboratory, K. SENGUPTA, Saha Institute of Nuclear Physics, S. WESSEL, University of Stuttgart, YONG BAEK KIM, University of Toronto — We study hard-core bosons with nearest-neighbor repulsion on the kagome lattice at different filling factors using quantum Monte Carlo simulations and a dual vortex theory. At half-filling, the ground state of the system is always a uniform superfluid in contrast to the case of the triangular lattice. There exists a quantum phase transition from a superfluid to a valence bond solid phase away from half-filling. The possibility of unusual quantum criticality is investigated.

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