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Spin-liquid phase in a spin-1/2 quantum magnet on the kagome lattice SERGEI ISAKOV, YONG BAEK KIM, ARUN PARAMEKANTI, University of Toronto — We study a model of hard-core bosons with short-range repulsive interactions at half filling on the kagome lattice. This model is equivalent to an easy-axis spin-1/2 quantum model with no special conservation laws. Using quantum Monte Carlo numerics, we find that this model exhibits a continuous superfluid-insulator quantum phase transition, with exponents $z = 1$ and $\nu = 0.67(5)$. We show unambiguously that the insulator is a Z_2 fractionalized spin liquid phase with short-ranged density and bond correlations, topological order, and exponentially decaying spatial vison correlations. In addition, we map out the finite temperature phase diagram. A Kosterlitz-Thouless finite temperature superfluid-insulator transition becomes strongly first order as the strength of the repulsive interactions increases. This is consistent with the zero temperature transition to the fractionalized phase.

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