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**Chern-Simons theory for Heisenberg spins on the Kagome Lattice** KRISHNA KUMAR, Univeristy of Illinois at Urbana-Champaign, KAI SUN, Univeristy of Michigan, EDUARDO FRADKIN, Univeristy of Illinois at Urbana-Champaign — We study the problem of Heisenberg spins on the frustrated Kagome lattice using a 2D Jordan-Wigner transformation that maps the spins (hard-core bosons) onto a system of (interacting) fermions coupled to a Chern-Simons gauge field. This mapping requires us to define a discretized version of the Chern-Simons term on the lattice. Using a recently developed result on how to define Chern-Simons theories on a class of planar lattices, we can consistently study spin models beyond the mean-field level and include the effects of fluctuations, which are generally strong in frustrated systems. Here, we apply these results to study magnetization plateau type states on the Kagome lattice in the regime of XY anisotropy. We find that the 1/3 and 2/3 magnetization plateaus are chiral spin liquid states equivalent to a primary Laughlin fractional quantum Hall state of bosons with (spin) Hall conductivity $\frac{1}{2}\frac{1}{4\pi}$ and semionic excitations. The $\frac{5}{9}$ plateau is a chiral spin liquid equivalent to the first Jain descendant. We also consider the spin-1/2 Heisenberg model on the Kagome lattice with a chirality-breaking term on the triangular plaquettes. This situation also leads to a primary Laughlin bosonic fractional quantum Hall type state with filling fraction 1/2.

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