Coupled spin-1/2 ladders as microscopic models for non-Abelian chiral spin liquids PO-HAO HUANG, Boston Univ, JYONG-HAO CHEN, Paul Scherrer Institute, ADRAIN FEIGUIN, Northeastern Univ, CLAUDIO CHAMON, Boston Univ, CHRISTOPHER MUDRY, Paul Scherrer Institute — We construct a two-dimensional (2D) lattice model that is argued to realize a gapped chiral spin liquid with (Ising) non-Abelian topological order. The building blocks are spin-1/2 two-leg ladders with $SU(2)$-symmetric spin-spin interactions. The two-leg ladders are then arranged on rows and coupled through $SU(2)$-symmetric interactions between consecutive ladders. The intra-ladder interactions are tuned so as to realize the $c = 1/2$ Ising conformal field theory, a fact that we establish numerically via Density Matrix Renormalization Group (DMRG) studies. Time-reversal breaking inter-ladder interactions are tuned so as to open a bulk gap in the 2D lattice system. This 2D system supports gapless chiral edge modes with Ising non-Abelian excitations but no charge excitations, in contrast to the Pfaffian non-Abelian fractional quantum Hall state.

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