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Topological insulator in a non-Abelian lattice model and anyonic fermions in two-body color code model[1] MEHDI KARGARIAN, GREGORY A. FIETE, Department of Physics,The University of Texas at Austin — We investigated topological phases in several decorated lattices such as the square- octagon and spin ruby lattices. The underlying models can be potentially simulated in optical lattices or in multi-orbital transition metal oxides. In the square-octagon lattice we apply a set of non-Abelian gauge fields to modulate the hopping between sites. Inversion symmetric fields open a gap and the model realizes topological band insulating phase. If the inversion symmetry is broken, a quantum phase transition between phases with different quantum orders takes place. These phases are characterized by number of Dirac nodes and the associated winding numbers. We also probe the topological phases in the spin ruby lattice with emerging anyonic fermions coupled to nontrivial gauge fields associated with the local symmetry of the model. And we further characterize our results by topological entanglement entropy and entanglement spectrum. M. Kargarian and G. A. Fiete, Phys. Rev. B 82, 085106 (2010).

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Mehdi Kargarian
Department of Physics,The University of Texas at Austin

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