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Hubbard Model on the Pyrochlore Lattice: a 3D Quantum Spin Liquid B. NORMAND, Renmin University, Beijing, Z. NUSSINOV, Washington University, St. Louis — We demonstrate that the insulating one-band Hubbard model on the pyrochlore lattice contains, for realistic parameters, an extended quantum spin-liquid phase. This is a three-dimensional spin liquid formed from a highly degenerate manifold of dimer-based states, which is a subset of the classical dimer coverings obeying the ice rules. It possesses spinon excitations, which are both massive and deconfined, and on doping it exhibits spin-charge separation. We discuss the realization of this state in effective $S = 1/2$ pyrochlore materials.

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