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Ground state uniqueness of the twelve site RVB spin-liquid parent Hamiltonian on the kagome lattice[1] ZHENYU ZHOU, Department of Physics and Astronomy, University of Pittsburgh, School of Physics, Astronomy and Computational Sciences, George Mason University, JULIA WILDEBOER, National High Magnetic Field Laboratory, Florida State University, ALEXANDER SEIDEL, Department of Physics, Washington University in St. Louis — Anderson's idea of a (short-ranged) resonating valence bond (RVB) spin liquid has been the first ever proposal of what we now call a topologically ordered phase. Since then, a wealth of exactly solvable lattice models have been constructed with topologically ordered ground states. For a long time, however, it has been difficult to realize Anderson's original vision in such solvable models, according to which the ground state has an unbroken SU(2) spin rotational symmetry and is dominated by fluctuation of singlet bonds. The kagome lattice is the simplest lattice geometry for which parent Hamiltonians stabilizing a prototypical spin-1/2 short-ranged RVB wave function have been constructed and strong evidence has been given that this state belongs to a topological phase. The uniqueness of the desired RVB-type ground states has, however, not been rigorously proven for the simplest possible such Hamiltonian, which acts on 12 spins at a time. Rather, this uniqueness has been demonstrated for a longer ranged (19-site) variant of this Hamiltonian by Schuch et al., using powerful approach of projected entangled-pair states. In this talk, we report on a "ground state intersection property" implying the ground state uniqueness of the 12-spin Hamiltonian for lattices of arbitrary size.

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