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Entanglement in Resonating Valence Bond states WEIFEI LI, TOMMASO ROSCILDE, STEPHAN HAAS , Univ. of Southern California — Resonating-valence-bond (RVB) states are among the strongest candidates for the quantum-disordered ground state of important families of low-dimensional quantum spin Hamiltonians, in particular in presence of frustration. We have studied the entropy of entanglement in RVB states defined on 1D and 2D lattices. In the 1D case, we were able to treat analytically RVB states with singlets ranging from nearest neighbors to infinity. In 2D we treat the case of nearest-neighboring singlets analytically, while the case of longer-range singlets is approached numerically. By using basic combinatorical mathematics and numerical manipulation of the ground-state density matrix, we obtain new results about the scaling of the block entropy of entanglement. In particular we explicitly provide a lower bound for the entropy of entanglement in the 2D case.

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