

Abstract Submitted
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Exact Spin Liquid Ground States of the Quantum Dimer Model on the Square and Honeycomb Lattices HONG YAO, Stanford University and Tsinghua University, STEVE KIVELSON, Stanford University — We study a generalized quantum hard-core dimer model on the square and honeycomb lattices, allowing for first and second neighbor dimers. At generalized Rohksar-Kivelson points, the exact ground states can be constructed, and ground-state correlation functions can be equated to those of interacting 1+1 dimensional Grassmann fields. When the concentration of second neighbor dimers is small, the ground state correlations are shown to be short-ranged corresponding to a (gaped) spin liquid phase. On a 2-torus, the ground states exhibit fourfold topological degeneracy. On a finite cylinder we have found a dramatic even-odd effect depending on the circumference, and propose that this can be used as a numerical diagnostic of the phase, more generally.

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