Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Numerical studies of AKLT valence bond solids in one, two and three dimensions KEOLA WIERSCHEM, KEVIN BEACH, The University of Mississippi — The fixed-point valence bond solids of Affleck, Kennedy, Lieb and Tasaki (the so-called AKLT states) have become archetypes of symmetry protected topological order. These states are constructed by first placing M valence bonds on each pair of neighboring lattice points, and then symmetrizing the Mz resulting spin-1/2 degrees of freedom at each lattice site into a combined spin-S degree of freedom with $2S = Mz$ (where M is the multiplicity of the AKLT state and z is the lattice coordination number). Using Monte Carlo sampling of the AKLT wavefunctions in the loop gas framework, we directly calculate correlation functions and energy gap estimators for these states in one, two and three dimensions. We also study the behavior of the so-called strange correlator, which has been proposed as a measure of symmetry protected topological order.

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Date submitted: 06 Nov 2015 Electronic form version 1.4