Titel: Two quantum spin chains with a common random geometric scaffolding

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Abstract:
Equilibrium states and ground states of both classical and quantum systems can often be understood in terms of their underpinning random geometric structures. A case in point is a pair of well recognized quantum models: 1) spin-S quantum spins with the SU(2S+1) invariant Affleck Hamiltonian, and 2) S=1/2 spins with the XXZ Hamiltonian, and anisotropy delta. Depending on its parameter, each exhibits a quantum transition to a translation symmetry broken phase with a pair of ground state. In one case that is manifested in energy oscillations and in the other in Neel order. While the models exhibit different physical characteristics, their ground state functionals are expressible in terms of a common random lop system, one which is associated also with the classical Fortuin-Kasteleyn Q-state random cluster model. As it turns out, these classical and quantum systems are simpler to understand when considered from a cross perspective.