

# Ground state expansion and the spectral gap of stoquastic Hamiltonians

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Using a mapping from stoquastic Hamiltonians to Markov chains that generalizes previously known constructions I'll describe a new characterization of the spectral gap in terms of the conductance or vertex expansion of the ground state probability distribution. By quantitatively relating the spectral gap to the presence of bottlenecks in multi-modal ground state distributions we will further our understanding of the kinds of probability distributions that stoquastic adiabatic optimization can sample from efficiently. I'll also discuss the implications of these bounds for stoquastic Hamiltonians with  $k$ -local off-diagonal terms, as well as a partial extension of the bounds to the non-stoquastic case.