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Detailed analysis of critical points in coupled spin dimer systems[1]
DOMINIK STRASSEL, Univ. of Kaiserslautern, PETER KOPIETZ, Univ. of Frankfurt, SEBASTIAN EGGERT, Univ. of Kaiserslautern — Spin dimer systems are a promising playground for the detailed study of quantum phase transitions. In many cases it is sufficient to use the magnetic field as the tuning parameter in order to reach interesting non-trivial critical points and observe a crossover from the characteristic scaling near the critical point to the behavior of a finite temperature phase transition. In order to quantitatively demonstrate those effects and inspired by recent experiments we have started large scale quantum Monte Carlo simulations in order to analyze several different physical quantities in spin dimer systems, namely the susceptibility, the magneto-caloric effect, and the spin stiffness. We discuss in detail how the phase transitions (quantum and finite temperature) are manifest in the characteristic scaling behavior near critical points by comparing them with interacting boson theories. For two dimensional systems the predicted logarithmic corrections cannot be observed, however.

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