Magnetic to valence-bond-solid transition in an S=1/2 XY model with ring-exchange
ANDERS SANDVIK, Boston University

Within the Landau-Ginzburg-Wilson framework, phase transitions between two ordered phases with different symmetries are generically of first order, or there is a region of coexistence of the two phases. However, It has recently been argued [1] that there is a generic class of continuous order-order quantum phase transitions, where the critical point is characterized by deconfined spinon degrees of freedom. Evidence of such a transition, between a magnetic (or superfluid in a bosonic representation) and a valence-bond-solid (VBS) phase had previously been observed in large-scale quantum Monte Carlo simulations [2] of a 2D XY model which in addition to the standard nearest-neighbor exchange J contains a four-particle exchange of strength K. The VBS phase in this model is not favored by the J and K interactions individually (the K-only model has an Ising-like antiferromagnetic ground state), but emerges out of competition between the two terms. Here I will discuss recent efforts [3] to characterize the magnetic-VBS transition in more detail (extracting the critical exponents) and comparing the behavior with predictions of the deconfined quantum-criticality scenario.