Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Finite-temperature valence-bond-solid transition of quantum spins in two dimensions[1] SONGBO JIN, ANDERS SANDVIK, Boston University
— The $S = 1/2$ Heisenberg model on the 2D square lattice with four- or six-neighbor spin interactions (JQ model) hosts a quantum phase transition between Néel and valence-bond-solid (VBS) ground states. The deconfined quantum critical (DQC) point, predicted by the theory of Senthil *et al.*[1], may be realized in this model [2]. Here we study the finite-temperature phase transition between the VBS (Z_4 symmetry breaking) to the paramagnetic state. We find continuously changing exponents with the correlation-length exponent ν close to the Ising value far from the $T = 0$ critical point, and diverging when the critical temperature $T_c \to 0^+$. This is in accord with the DQC theory, according to which the transition for $T_c \to 0^+$ should approach a Kosterlitz-Thouless fixed point.

[1] T. Senthil, L. Balents, S. Sachdev, A. Vishwanath, and M. P. A. Fisher, Phys. Rev. B **70**, 144407 (2004).
[2] R. K. Kaul, R. G. Melko, A. W. Sandvik, arXiv:1204.5405.

[1]Supported by Grant NSF DMR-1104708

Songbo Jin
Boston University

Date submitted: 27 Nov 2012 Electronic form version 1.4