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Computational Studies of $T = 0$ Neel-Valence bond solid transitions in two dimensional quantum antiferromagnets KEDAR DAMLE, Tata Institute, FABIEN ALET, SUMIRAN PUJARI, Univ. Paul Sabatier, Toulouse, ARGHA BANERJEE, Institute for Mathematical Sciences, India, ARUN PARAMEKANTI, University of Toronto — We use Quantum Monte Carlo techniques to study a direct quantum phase transition in two dimensional quantum antiferromagnets between a collinear Neel ordered state and a valence bond solid ordered singlet state. We contrast the strongly first order behavior of the transition in cases where the valence bond solid order is of a "staggered" type with the deconfined critical behavior seen in cases where the valence-bond solid order is of a columnar type. In the deconfined case, we find evidence for weak, apparently logarithmic violations of scaling. [References: preprint; Phys. Rev. B 83, 235111 (2011); Phys. Rev. B 83, 134419 (2011); Phys. Rev. B 82, 155139 (2010)]

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