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**Unconventional quantum critical points in the generalized quantum dimer models** ZI-XIANG LI, Institute for Advanced Study, Tsinghua University, Beijing, FAN YANG, School of Physics, Beijing Institute of Technology, Beijing, HONG YAO, Institute for Advanced Study, Tsinghua University, Beijing — We study a class of generalized quantum dimer models with both NN and NNN dimers on the square lattice, whose exact ground state wave function can be constructed. By varying the weight of NNN dimers and the interactions between dimers, we obtain a rich quantum phase diagram which hosts quantum spin liquid phases and various valence bond solids. We then investigate the quantum critical behavior of the transitions between spin liquids and valence bond solids by analytically studying its effective field theory and numerically doing variational Monte Carlo simulations. We discuss unconventional quantum critical points in this system.

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