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Z_2 Spin Liquid and Valence Bond Solid Quantum Phase Transition KEVIN SLAGLE, CENKE XU, Department of Physics, University of California, Santa Barbara — We propose a theory to describe the quantum phase transition between a Z_2 spin liquid and a valence bond solid (VBS) on a triangular lattice. This phase transition can not be described using the standard Landau-Ginzburg-Wilson (LGW) theory of spontaneous symmetry breaking because a Z_2 spin liquid has topological order, which can't be described by an order parameter. We develop a duality formalism which treats the spin liquid's topological vison excitation as a local particle, whose condensation will drive the Z_2 topological order into a VBS state. We have considered both isotropic and anisotropic triangular lattices, and second order phase transitions are found in both cases. At these transitions, the VBS order parameters are expected to have an enormous anomalous dimension.

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