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Global phase diagrams of frustrated quantum antiferromagnets in two dimensions: doubled Chern-Simons theory CENKE XU, SUBIR SACHDEV, Harvard University — We present a general approach to understanding the quantum phases and phase transitions of quantum antiferromagnets in two spatial dimensions. We begin with the simplest spin liquid state, the Z_2 spin liquid, whose elementary excitations are spinons and visons, carrying Z_2 electric and magnetic charges respectively. Their dynamics are expressed in terms of a doubled U(1) Chern-Simons theory, which correctly captures the "topological" order of the Z_2 spin liquid state. We show that the same theory also yields a description of the variety of ordered phases obtained when one or more of the elementary excitations condense. Field theories for the transitions and multicritical points between these phases are obtained. We also survey experimental results on antiferromagnets on the anisotropic triangular lattice, and make connections between their phase diagrams and our results.

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