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Topological Phenomena in Magnetism

In these lectures I will discuss the statistical physics of models of geometrically frustrated magnets that have low temperature states with both strong correlations and large fluctuations. The overall aim is to show how to construct coarse-grained descriptions of these systems that correctly capture long-distance properties. Examples will include the triangular lattice Ising antiferromagnet, spin ice, and dimer models. The coarse-grained theories involve height models and emergent gauge theories.

I will also outline the relationship between these classical problems and theories of quantum spin liquids.

Links to some relevant background material are available from http://topo-houches.pks.mpg.de/