On two particular *N*-state generalizations of the quantum Ising model

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The Ising model, originally proposed over a century ago as a classical model of magnetism, is one of the most widely studied models in physics. A key feature of the Ising model, in both its classical and quantum formulations, is the underlying mathematical structure of free fermions. In remarkable developments over many decades, several known *N*-state generalizations of the quantum version of the Ising model have been found. These include the enigmatic *N*-state superintegrable chiral Potts model and the free parafermion $Z(N)$ model. The model of free parafermions is particularly intriguing because its Hamiltonian is non-Hermitian.

In this talk I will describe recent progress on both the superintegrable chiral Potts model and the free parafermion model.