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Title: An introduction to quantum magnetism

Abstract:
In this set of lectures, I will present an overview to quantum spin systems and introduce the basic notions in quantum magnetism. The Heisenberg model, a parent Hamiltonian in strongly correlated electron systems, is derived as an interplay of Coulomb interaction and Pauli's exclusion principle. Some general characteristics of the Heisenberg model, specially for the one and quasi-one dimensional models, are discussed. Different approaches to the ground state properties of quantum models are summarized, among which the spin-wave theory is elaborated in detail. The extension of spin-wave theory to cluster approaches is introduced, via a bosonization technique and couple of examples.