Integrable Dicke and Jaynes-Cummings models, and extensions

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The interaction of atomic or molecular states with quanta of electromagnetic radiations is described by the Jaynes-Cummings Hamiltonian, and its generalization the Dicke Hamiltonian. It has been shown that these models are integrable by means of a Bethe Ansatz state, coupling the electromagnetic quanta with the excitation modes of the atoms. In this contribution, it will be discussed how the Dicke model can be derived from the hyperbolic Richardson-Gaudin integrable models by means of a pseudo-deformation of the quasispin algebra, and several extensions will be presented