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Title: Spin-Wave Excitations in Quantum Heisenberg Models

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Abstract: Spin waves are low energy collective excitations in exchange coupled magnetic systems. They determine the reduction of the order parameter by quantum fluctuations and constitute the ground state of ordered magnetic systems. In this thesis, we study the linear spin wave theory with the techniques of Holstein-Primakoff and Dyson-Maleev bosonization with Bogoliubov transformations. Linear spin wave theory is applied to different magnetic systems such as Heisenberg model and its anisotropic variants and the magnon dispersion relations have been derived. We also explore spin wave theory with a self consistent mean field method to account for higher order corrections which are not included in its linear variety.

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