

Chromium: Unraveling its Intriguing Properties

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Neutron scattering is the method of choice for characterizing the static and dynamic properties of magnetic materials. While ferromagnets are well understood in the localized and itinerant limits in terms of spin waves and Stoner excitations, antiferromagnets like the archetypical chromium or the doped cuprates are still hiding some intriguing behavior. Despite its simple crystallographic structure (bcc) and tens of years of investigations, the magnetic excitations are barely understood.

In my talk I will report on some recent experiments using inelastic neutron scattering in order to resolve the magnetic excitation spectrum of Cr. The data demonstrate that it is the phason modes that contribute dominantly to the spectral weight of the magnetic excitations and not the spin waves. The results are compatible with RPA calculations. Due to the similarity of the excitation spectrum of Cr and some high T_c -superconductors one may speculate that phasons may also be the dominant magnetic excitations in other incommensurate magnetic systems as for example the cuprates.