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# Dipolar interactions and spin dynamics in the itinerant ferromagnet Ni

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The itinerant ferromagnet nickel has a long history of studies investigating its spin wave and critical, paramagnetic scattering over a large range in temperature. Close to $T_C$ = 631 K, the behavior of Ni, as observed with neutron scattering, is well explained by mode coupling and renormalization group theory calculations based on the isotropic Heisenberg model. According to scaling theory, similar properties are expected for prominent ferromagnetic systems such as Fe, EuO and EuS. However, to understand the static and dynamical scaling properties of these systems the introduction of an additional scaling quantity $q_D$ is required. The dipolar wavevector $q_D$ quantifies the anisotropic, long range dipolar coupling of the electrons. In the long wavelength limit and $q < q_D$ , the influence of dipolar interactions becomes dominant leading to a deviation of the universal dynamical scaling function and spin wave dispersion as predicted for pure Heisenberg ferromagnets. This scaling was verified for Fe, EuO and EuS by neutron spectroscopy, but to date no evidence has been found in Ni.

We present our investigations of the critical dynamics in Ni using the extreme energy resolution of the MIEZE spectrometer RESEDA. Our results show excellent overall agreement with spin wave and scaling theory, but imply that the $q_D$ is at least 2 times smaller then previously reported, inducing changes in the dynamic properties at the absolute limit of a modern spectrometer's resolution.

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