

Abstract Submitted
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Possible Itinerant Moment Contributions to the Magnetic Excitations in Gd, Studied by Neutron Spectroscopy¹ G.E. GRANROTH, A.A. ACZEL, J.A. FERNANDEZ-BACA, S.E. NAGLER, Oak Ridge National Laboratory — Many experimental features in magnetic superconductors are also present when these complex materials are in the normal state. Therefore studies of simpler itinerant magnets may help provide understanding of these phenomena. We chose to study Gd as it has an $\sim 0.6\mu_B$ itinerant moment in addition to a $\sim 7.0\mu_B$ localized moment. The SEQUOIA spectrometer, at the Spallation Neutron Source at Oak Ridge National Laboratory, was used in fine resolution mode with $E_i=50$ meV neutrons, to measure the magnetic excitations in a 12 gm ^{160}Gd single crystal. The crystal was mounted with the $h0l$ plane horizontal and rotated around the vertical axis to map out the excitations. The measured magnetic structure factor for the acoustic modes in the $hh0$ direction has an intensity step at $h \sim 0.3$. Electronic band structure calculations (W. M. Temmerman and P. A. Sterne, J. Phys: Condes. Matter, **2**, 5529 (1990)) show this Q position to be near several band crossings of the Fermi surface. A detailed analysis, including instrumental resolution, is presented to clarify any relationship between the magnetic structure factor and the electronic band structure.

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