Abstract Submitted
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Magnetic Excitations in the Nearly Localized, Itinerant Magnet Gd, Studied by Neutron Spectroscopy[1] G.E. GRAROTH, A.A. ACZEL, J.A. FERNANDEZ-BACA, S.E. NAGLER, Oak Ridge National Laboratory — Many of the current questions about magnetic superconductors are 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 an Itinerant magnet near to the fully localized limit. The system of choice, Gd has a total moment size of $\sim 7.6\mu_B$ of which $\sim 0.6\mu_B$ of that is itinerant. We used the SEQUOIA spectrometer, at the Spallation Neutron Source at Oak Ridge National Laboratory, to measure the magnetic excitations in a 12 gm ^{160}Gd single crystal. The fine resolution Fermi chopper was spun at 360 Hz and phased for $E_i = 50$ meV. The crystal was mounted with the $h0l$ plane horizontal and then rotated around the vertical axis in 1° steps. This method, and the large out of plane detector coverage of SEQUOIA, provided continuous coverage of a large region of reciprocal space allowing us to map the magnetic excitations. This map provides a measured structure factor for comparison to spin wave models with and without itinerancy effects. There measurements also more clearly resolve the excitations along the $h00$ direction than in previous studies (J. W. Cable, R. M. Nicklow and N. Wakabayashi Phys. Rev. B **32**, 1710 (1985)).

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Garrett Graroth
Oak Ridge National Laboratory

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