Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Neutron scattering study of vanadium spinel MnV_2O_4. OVIDIU GARLEA, STEPHEN NAGLER, Oak Ridge National Laboratory, RONGYING JIN, DAVID MANDRUS, ORNL, BERTRAND ROESSLI, SINQ, PSI, MARTHA MILLER, ARTHUR SCHULTZ, IPNS, CHRISTOPHER FROST, ISIS, DOUG ABERNATHY, SNS, ORNL — We report the results of elastic and inelastic neutron scattering studies carried out on single-crystals of MnV_2O_4. In this spinel system the octahedral site is occupied by the V^{3+} ion, having two 3d electrons in threefold t_{2g} levels, and the tetrahedral site is occupied by the Mn^{2+} ($3d^5$) with no orbital degrees of freedom. MnV_2O_4 was found to exhibit a ferrimagnetic ordering at approximately 56 K. There is a structural phase transition from a cubic to a tetragonal phase at about 53K, reportedly associated with a spin reorientation process [1]. The inelastic measurements at low temperatures reveal the presence of an energy gap in spin-wave spectrum of 1.6 meV. The gap decreases with increasing temperature, and vanishes as the temperature is increased above the structural transition. Linear spin wave theory is used to evaluate the exchange interactions in this material.
[1] R. Plumier and M. Sougi, Solid State Commun. 64, 53 (1987)

Ovidiu Garlea
Oak Ridge National Laboratory

Date submitted: 29 Nov 2006 Electronic form version 1.4