Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Magnetic structure and spin excitations in $BaMn_2Bi_2$[1] M.D. LUMSDEN, S. CALDER, Quantum Condensed Matter Division, Oak Ridge National Laboratory, B. SAPAROV, Materials Science and Technology Division, Oak Ridge National Laboratory, H.B. CAO, Quantum Condensed Matter Division, Oak Ridge National Laboratory, J.L. NIEDZIELA, Instrument and Source Division, Oak Ridge National Laboratory, A.S. SEFAT, Materials Science and Technology Division, Oak Ridge National Laboratory, A.D. CHRISTIANSON, Quantum Condensed Matter Division, Oak Ridge National Laboratory — The magnetic structure and associated spin wave excitations of the recently synthesized $BaMn_2Bi_2$ have been studied using neutron scattering. $BaMn_2Bi_2$ exhibits the same $ThCr_2Si_2$ crystal structure as the 122 iron superconductors (AFe_2As_2). Single crystal neutron diffraction reveals that the ordered state below $T_N \sim 390$ K is consistent with G-type antiferromagnetic order and suggests the presence of a structural phase transition at 100 K. Inelastic neutron scattering reveals anisotropic spin waves characterized by a gap of 16 meV, in-plane excitations with a maximum energy of 55 meV and a c-axis dispersion extending to about 35 meV. The observed magnetic excitations are well described by a J_1-J_2-J_c Heisenberg Hamiltonian and the relevant exchange interactions are extracted. The results will be compared to other related materials such as $BaFe_2As_2$ and $BaMn_2As_2$.

[1]This work was supported by the Scientific User Facilities Division and the Materials Sciences and Engineering Division, Office of Basic Energy Sciences, U.S. Department of Energy.

Mark Lumsden
Oak Ridge National Lab

Date submitted: 15 Nov 2013 Electronic form version 1.4