Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Electronic and Magnetic Properties of $Ba_{1-x}K_xMn_2As_2$ Studied by ^{55}Mn and ^{75}As-NMR S. YENINAS, A. PANDEY, D.C. JOHNSTON, Y. FURUKAWA, The Ames Laboratory — $BaMn_2As_2$ (Mn^{2+}; S = 5/2) is a G-type antiferromagnetic (AF) semiconductor with Néel temperature $T_N \sim 625$ K and a small band gap of ~ 27 meV. Hole doping by substitution of Ba with K drives $BaMn_2As_2$ into a metallic state while maintaining the same AF spin structure with similar high T_N. In order to investigate hole doping effects on electronic and magnetic properties in $Ba_{1-x}K_xMn_2As_2$from a microscopic point of view, we have conducted ^{55}Mn and ^{75}As-NMR spectra and spin-lattice relaxation measurements on single crystals of $Ba_{1-x}K_xMn_2As_2$ (x = 0, 0.04, 0.4). The temperature (T) dependence of $1/T_1$ for ^{55}Mn and ^{75}As for the x=0 compound shows $1/T_1 \sim T^3$ dependence for both nuclei, suggesting that $1/T_1$ of the nuclei arises from interactions with magnon excitations in the local-moment AF state. On the other hand, the $1/T_1$ of both nuclei is found to be proportional to T (Korringa relation) in K-doped materials below T_N, which corresponds to the AF metallic state in $Ba_{1-x}K_xMn_2As_2$.

S. Yeninas
The Ames Laboratory

Date submitted: 14 Nov 2012 Electronic form version 1.4