Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Antiferromagnetism in $CaAl_2Si_2$-type $CaMn_2As_2$ and $SrMn_2As_2$ single crystals* N. S. SANGEETHA, ABHISHEK PANDEY, ZACKERY A. BENSON, D. C. JOHNSTON, Ames Laboratory, Department of Physics and Astronomy, Iowa State University, Ames, Iowa 50011 — Magnetic susceptibility versus temperature $\chi(T)$ measurements of $CaMn_2As_2$ and $SrMn_2As_2$ crystals show clear antiferromagnetic (AFM) transitions at $T_N \approx 65$ K and 120 K,[1] respectively. The anisotropic behaviors in $\chi(T \leq T_N)$ suggest that both compounds are noncollinear antiferromagnets which may result either from an intrinsic noncollinear structure or from multiple collinear AFM domains that are not aligned collinearly.[2] The $\chi(T)$ data at $T > T_N$ reveal that both compounds exhibit strong short-range AFM ordering, evidently associated with quasi-two-dimensional spin lattices. The electrical resistivities show insulating ground states with activation energies of ≈ 63 meV in $CaMn_2As_2$ and 44 meV in $SrMn_2As_2$. The experimental results thus reveal that both $(Ca, Sr)Mn_2As_2$ materials are AFM insulators at low temperatures and in analogy with the high T_c cuprates, may be potential parent compounds for $CaAl_2Si_2$-type superconductors.
*Work was supported by the USDOE under Contract No. DE-AC02-07CH11358.
[1]Z.W. Wang et. al, J. Phys. Chem. Solids **72**, 457 (2011).
[2]D. C. Johnston, PRL **109**, 077201 (2012); PRB **91**, 064427 (2015).

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Date submitted: 05 Nov 2015 Electronic form version 1.4