Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Collinear antiferromagnetism in trigonal $SrMn_2As_2$ revealed by single crystal neutron diffraction A. KREYSSIG*, P. DAS*, N. S. SANGEETHA*, Z. A. BENSON*, T. HEITMAN+, D. C. JOHNSTON*, A. I. GOLDMAN*, *Ames Laboratory, Dept. of Phys. and Astro., Iowa State University, IA, USA; +University of Missouri Research Reactor, MO, USA — FeAs-based compounds and related materials have been an area of intense research in understanding the complex interplay between magnetism and superconductivity. Here we report on the magnetic structure of $SrMn_2As_2$ that crystallizes in a trigonal structure ($P\bar{3}m1$) and undergoes an antiferromagnetic (AFM) transition at $T_N \approx 120$ K. The temperature dependence of the magnetic susceptibility remains nearly constant below T_N with $H \parallel c$ while it decreases significantly with $H \parallel ab$. This shows that the local Mn moments order and lie in the ab plane instead of aligning along the c axis as in $BaMn_2As_2$. Single crystal neutron diffraction measurements on $SrMn_2As_2$ determined that the Mn moments are collinearly aligned in a G-type AFM order with AFM alignments between a moment and all nearest neighbors in the basal plane and also perpendicular to it. This manifests that G-type AFM order is robust for Mn122 systems despite different symmetries, i.e. tetragonal for $BaMn_2As_2$ and trigonal for $SrMn_2As_2$.
Work at Ames Laboratory was supported by the DOE, BES, Division of Materials Sciences & Engineering, through DE-AC02-07CH11358. This research used resources at University of Missouri Research Reactor.

Andreas Kreyssig
Ames Laboratory / Iowa State University

Date submitted: 06 Nov 2015 Electronic form version 1.4