Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Quasi-two-dimensional non-collinear magnetism in the Mott insulator $Sr_2F_2Fe_2OS_2$[1] SHAN WU, C. BROHOLM, Johns Hopkins University, LIANG L. ZHAO, JIAKUI K. WANG, E. MOROSAN, Rice University, J.P. HODGES, Oak Ridge National Laboratory, JOHNS HOPKINS UNIVERSITY TEAM, RICE UNIVERSITY COLLABORATION, OAK RIDGE NATIONAL LABORATORY COLLABORATION — We study the magnetism of $Sr_2F_2Fe_2OS_2$ through neutron powder diffraction and thermodynamic and transport measurement. Quasi-two-dimensional magnetic order develops below T_N=106K with an in-plane correlation length exceeding 310 Å and an out-of-plane correlation length of only 17(3) Å. The data are well described by a two-k structure with k_1=(1/2,0,1/2) and k_2=(0,1/2,1/2). The ordered moment is 3.3(1) μ_B oriented along the in-plane components of k. This structure is composed of orthogonal AFM chains intersecting at super-exchange mediating O sites. The Density Function Theory (by Liang L.Zhao, Jiakui K. Wang, etc.) also leads to this structure and a narrower Fe 3d band than for the iron pnictides from which electronic correlations produce a Mott insulator.

[1]This research was supported by the U.S. DoE under award DE-FG02-08ER46544 and contract DEAC05-00OR22725 with UT-Battelle, LLC. The work at Rice University was supported by AFOSR-MURL.

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Date submitted: 28 Nov 2012 Electronic form version 1.4