Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Magnetic Order and Frustration in Doped $Sr_2Mn_3As_2O_2$ CHRISTOPHER GEORGEN, CHIH-WEI CHEN, JIAKUI WANG, EMILIA MOROSAN, Rice University — Crystal structure is often key in dictating a material's magnetic and physical properties. Two components of crystal structure that can be particularly influential are reduced dimensionality (1D or 2D) or geometric frustration. The layered crystal structure of $Sr_2Mn_3As_2O_2$ which crystallizes in the tetragonal I4 /mmm space group, exhibits both these features. This compound is of particular interest because it consists of Fe pnictide-*like* tetrahedral planes that alternate with Cu-O-*like* octahedral layers. This structure is a promising avenue to study geometric effects in relation to unconventional superconductivity. Here we report a magnetic study of the effects of 3d and 4d transition metal substitutions on the Mn site, with emphasis on the resulting long range *and* short range order. AC and DC magnetization data provide evidence for spin glass to cluster glass crossover with 4d metal doping, while 3d metal doping suppresses both the magnetic order and glassy state. This can be attributed to half-filled Mn 3d shells in a 2D magnetic structure as suggested by neutron diffraction data and band structure calculations.

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Date submitted: 14 Nov 2014 Electronic form version 1.4