Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Neutron diffraction study of the magnetic order in magnetic coordination polymer $CuF_2(H_2O)_2$(pyz) (pyz=pyrazine) CUIHUAN WANG, MARK D. LUMSDEN, ANDREW D. CHRISTIANSON, Oak Ridge National Laboratory, JOHN A. SCHLUETER, Material Science Division, Argonne National Laboratory — The new linear chain coordination polymer $CuF_2(H_2O)_2$(pyz)(pyz=pyrazine) provides an interesting example for the study of low dimensional physics. $CuF_2(H_2O)_2$(pyz) has a monoclinic structure where the Cu^{2+} ions form a 2 dimensional (2D) square lattice in the bc-plane. Short range magnetic order appears below 10 K followed by a transition to long range antiferromagnetic order with $T_N \sim 2.6$ K. To further understand the magnetic behavior of $CuF_2(H_2O)$(pyz), we have performed neutron diffraction experiments on deuterated single crystals $CuF_2(D_2O)_2(d_4\text{-pyz})$. Below 2.6 K we observe magnetic Bragg peaks which are consistent with the propagation vector (1/2 1 0). Refinement of the data shows that the magnetic moment lies in the ac-plane. Fitting the temperature dependence of the magnetic order parameter to a power-law form in the reduced temperature range of $1\text{-}T/T_N = 0.01\text{-}0.4$ yields a critical exponent, β, of 0.25 ± 0.01. This result is consistent with the expectation for a 2D XY model where β=0.23 [1].

[1] S. T. Bramwell and P. C. W. Holdsworth, J. Phys.: Condens. Matter. **5** L53-L59 (1993).

CuiHuan Wang
Oak Ridge National Laboratory

Date submitted: 28 Dec 2010 Electronic form version 1.4