Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Incommensurate lattice modulations in Potassium Vanadate[1]
BRYAN CHAKOUMAKOS, ARNAB BANERJEE, LUMSDEN MARK, HUIBO CAO, Quantum Condensed Matter Div., Oak Ridge National Laboratory, Oak Ridge, TN - 37830, JONG-WOO KIM, Advanced Photon Source, Argonne National Laboratory, Lemont, IL - 60439, CHRISTINA HOFFMAN, XIAOPING WANG, Chem. Mat. Sci. Div., Oak Ridge Nat. Lab. Oak Ridge, TN - 37830 — Potassium Vanadate ($K_2V_3O_8$) is an S = 2D square lattice antiferromagnet that shows spin reorientation indicating a strong coupling between the magnetism and its dielectric properties with a promise of rich physics that promises multiferroicity. These tangible physical properties are strongly tied through a spin-lattice coupling to the underlying lattice and superlattice behavior. It has a superlattice (SL) onsetting below T_c =115 K with an approximate [3 x 3 x 2] modulation. Here we present our recent experiments at TOPAZ beamline at SNS which for the first time proves conclusively that the lattice modulations are incommensurate, with an in-plane Q of 0.315. We will also show our attempts to refine the data using JANA which requires a redefinition of the lattice, as well as the temperature and Q dependence of the superlattice modulation measured using neutrons at HFIR and synchrotron x-rays at APS. Our results are not only relevant for the ongoing search of multifunctional behavior in $K_2V_3O_8$ but also generally for the superlattice modulations observed in a large family of fresnoites.

[1]Work performed at ORNL and ANL is supported by U.S. Dept. of Energy, Office of Basic Energy Sciences and Office of User Facilities Division.

Arnab Banerjee
Quantum Condensed Matter Div., Oak Ridge National Laboratory, Oak Ridge, TN - 37830

Date submitted: 06 Nov 2015 Electronic form version 1.4