

Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

ANISOTROPIC PHASE DIAGRAM OF THE FRUSTRATED SPIN CHAIN β -TeVO₄. F. WEICKERT, M JAIME, N HARRISON, B. L. SCOTT, Los Alamos Natl Lab, A. LEITMAE, L. HEINMAA, R STERN, O JANSON, NICPB Tallinn, Estonia, H. BERGER, EPFL, Lausanne, Switzerland, H ROSNER, MPI CPfS, Dresden, Germany, A. A. TSIRLIN, Augsburg University, Germany — We will present experimental as well as theoretical data on β -TeVO₄ a candidate for the J_1 - J_2 chain model with ferromagnetic $J_1 \sim 18$ K and antiferromagnetic $J_2 \sim 48$ K coupling constants. The $T - H$ magnetic phase diagram is revealed by measurements of the magnetization, specific heat, magnetostriction, and thermal expansion on oriented single crystals at temperatures between 0.5 K and 50 K and in magnetic fields up to 50 T. The high field data were taken in a capacitor bank-driven pulsed magnet at NHMFL – LANL and complemented with measurements in a superconducting magnet. Our comprehensive study allows for the first time a detailed mapping of the phase diagram in both directions, $H \parallel ab$ and $H \parallel c$. We find clear evidence for 5 different phases including full polarization of the magnetic moments above 23 T that is only weakly dependent on the crystal orientation. Surprisingly, the phase boundary at the saturation field splits into two distinct lines below 5 K. The magnetic phases occurring at fields below 10 T show significant magnetic anisotropy between $H \parallel ab$ and $H \parallel c$. The nature of the different phases and regions in β -TeVO₄ is still far from being understood, but our results will stimulate further research on this interesting model compound.

Franziska Weickert
Los Alamos Natl Lab

Date submitted: 08 Dec 2015

Electronic form version 1.4