Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Quantum Phase Transitions and De-Coupling of Magnetic Sublattices in the Quasi-Two Dimensional Ising Magnet Co3V2O8 in a Transverse Magnetic Field K. FRITSCH, Helmholtz-Zentrum Berlin für Materialien und Energie (HZB), Berlin, Germany; Dept. of Physics and Astronomy, McMaster University, Hamilton, Canada, G. EHLERS, Neutron Scattering Science Division, ORNL, Oak Ridge, USA, K. C. RULE, HZB; ANSTO, Lucas Heights, Australia, K. HABICHT, HZB, M. RAMAZANOGLU, Dept. of Physics and Astronomy, McMaster University, H. A. DABKOWSKA, Brockhouse Institute for Materials Research (BIMR), Hamilton, Canada, B. D. GAULIN, Dept. of Physics and Astronomy, McMaster University; BIMR; Canadian Institute for Advanced Reseach, Toronto, Canada — The application of a magnetic field transverse to the easy axis, Ising direction in the quasi-two dimensional Kagome staircase magnet, $Co_3V_2O_8$, induces three quantum phase transitions at low temperatures, ultimately producing a novel high field polarized state, with two distinct sublattices. New time-of-flight neutron scattering techniques, accompanied by large angular access, high magnetic field infrastructure allows the mapping of a sequence of ferromagnetic and incommensurate phases and their accompanying spin excitations. At least one of the transitions to incommensurate phases at $\mu_0 H_{c1} \sim 6.25$ T and $\mu_0 H_{c2} \sim 7$ T are discontinuous, while the final quantum critical point at $\mu_0 H_{c3} \sim 13$ T is continuous.

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Date submitted: 14 Nov 2014 Electronic form version 1.4