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Quantum criticality in the kagome staircase system $Co_3V_2O_8$ in transverse magnetic field K. FRITSCH, McMaster Univ., K.C. RULE, Helmholtz-Zentrum Berlin, K.A. ROSS, McMaster Univ., Y. QIU, J.R.D. COPLEY, NCNR NIST, K. KIEFER, K. HABICHT, Helmholtz-Zentrum Berlin, H.A. DABKOWSKA, B.D. GAULIN, BIMR and McMaster Univ. — $Co_3V_2O_8$ (CVO) belongs to the kagome staircase family of orthorhombic materials in which Ising-like Co^{2+}, S=3/2 magnetic moments decorate a stacked and buckled version of the two-dimensional kagome lattice. In zero applied magnetic field, this material displays a complex series of five different magnetically ordered phases below ∼11 K which culminate in a simple ferromagnetic state below Tc∼6 K. Previous inelastic neutron scattering work[1] on this quasi-two-dimensional system showed that the exchange interactions within the kagome planes are rather weak (J∼1.25 meV), making this system an ideal candidate for the study of transverse field-induced quantum critical phenomena as have been observed in $LiHoF_4$ or recently in $CoNb_2O_6$. We have investigated the phase diagram of CVO with the transverse field applied along the stacking direction using magnetization as well as single crystal neutron scattering techniques. We will discuss how the ground state magnetic structure and spin dynamics of CVO evolve upon tuning the transverse magnetic field through the quantum critical point near Hc∼6 T. [1] M. Ramazanoglu et al., PRB 79, 024417 (2009).

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