

Abstract Submitted  
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**Order and excitations near quantum criticality in quasi-1D  $S=1/2$  easy-plane antiferromagnet  $\text{Cs}_2\text{CoCl}_4$**  GHEORGHE PASCUT, Rutgers, The State University of New Jersey, US, RADU COLDEA, University of Oxford, UK, FRANZ DEMMEL, ISIS Facility, UK, ZBIGNIEW TYLCZYNSKI, Adam Mickiewicz University, Institute of Physics, Poland — We explore the magnetic order and spin dynamics in the quasi-one-dimensional spin-1/2 easy-plane anisotropy antiferromagnet  $\text{Cs}_2\text{CoCl}_4$  in a magnetic field applied close to the easy-plane which drives a transition from spontaneous long-range magnetic order to a gapped quantum paramagnet. The commensurate antiferromagnetic order observed at low fields is stable over a wide field range but is replaced by an incommensurate magnetic order (spin density wave) just below the transition to paramagnetic. The main result is the observation of the new incommensurate magnetic phase which was not seen experimentally prior to this work and was also not predicted theoretically. Deep in the paramagnetic phase the excitations are sharp, gapped magnons with minima at the incommensurate wavevectors of the magnetic order below  $B_C = 2.36(2)$  T and the dispersion relations give values for the intra- and inter-chain couplings. In addition to one magnon excitations at high energies we also observe weak magnetic continuum scattering, which becomes stronger upon approaching the critical field from above and is attributed to multi-magnon transverse field scattering processes.

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