

Abstract Submitted
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Terahertz excitations near the quantum critical point in the 1D Ising chain quantum magnet CoNb_2O_6 ¹ CHRISTOPHER M. MORRIS, R. VALDÉS AGUILAR, S. KOOPAYEH, T.M. MCQUEEN, N.P. ARMITAGE, The Institute for Quantum Matter, Department of Physics and Astronomy, The Johns Hopkins University, Baltimore, MD 21218 — The one-dimensional magnet CoNb_2O_6 was recently demonstrated to be an excellent realization of a one-dimensional quantum Ising spin chain. It has been shown to undergo a quantum phase transition in a magnetic field oriented transverse to its ferromagnetically aligned spin chains. Low energy spin-flip excitations in the chains were recently observed via inelastic neutron scattering.² The energy spectrum of these excitations was shown to have an interesting energy scaling governed by symmetries of the E8 exceptional Lie group. Here, time-domain terahertz spectroscopy (TDTS) is used to investigate these optically active spin flip excitations in CoNb_2O_6 in an external magnetic field. For static magnetic fields oriented transverse to the spin chains, the terahertz excitations show evidence of the phase transitions that occur near the quantum critical magnetic field. Additional spin flip excitations are also observed for longitudinally oriented magnetic fields.

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²R. Coldea, *et al*, *Science* **327**, 177 (2010)

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