

Abstract Submitted
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A hierarchy of “meson” bound state excitations in the 1D ferromagnetic Ising chain CoNb_2O_6 ¹ CHRISTOPHER MORRIS, SEYED KOO-PAYEH, ANIRBAN GHOSH, OLEG TCHERNYSHYOV, TYREL M. MCQUEEN, N. PETER ARMITAGE, The Institute for Quantum Matter, Department of Physics & Astronomy, The Johns Hopkins University, Baltimore, MD 21218, ROLANDO VALDÉS AGUILAR, Center for Integrated Nanotechnologies, Los Alamos National Laboratory. MS K771. Los Alamos, NM 87545, JASON KRIZAN, ROBERT J. CAVA, Department of Chemistry, Princeton University, Princeton, NJ 08544 — The quantum magnet CoNb_2O_6 was recently demonstrated to be an excellent realization of the one-dimensional ferromagnetic Ising spin chain. 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 a 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 . A series of nine spin flip bound states is observed, whose energies can be modeled exceedingly well by the Airy function solutions to a 1D Schrödinger equation. Additionally, a novel bound state of excitations on neighboring chains is observed just below the onset of a two particle continuum.

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

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