Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

1D spin chain of Cu^{2+} in Sr_3CuPtO_6 with possible Haldane physics[1] JONATHAN LEINER, JOOSUNG OH, Seoul National University, ALEXANDER KOLESNIKOV, MATTHEW STONE, Oak Ridge National Laboratory, MANH DUC LE, ISIS Facility, Rutherford Appleton Laboratory, SANG-WOOK CHEONG, Rutgers University, JE-GEUN PARK, Seoul National University — Antiferromagnetic spin chain systems have attracted considerable attention since the discovery of fractional spinon excitations in spin-half chain systems and Haldane gap phases in spin-one chain systems. It has been reported from bulk susceptibility and heat capacity measurements that the magnetic Cu^{2+} ions in Sr_3CuPtO_6 exhibit S=1/2 Heisenberg spin chain behavior with a substantial amount of AFM interchain coupling. Using the modern time-of-flight inelastic neutron scattering spectrometer SEQUOIA at the SNS, we have probed the magnetic excitation spectrum for a polycrystalline sample of Sr_3CuPtO_6. Modeling with linear spin wave theory accounts for the major features of the spinwave spectra, including a nondispersive intense magnon band at 8meV. The magnetic excitations broaden considerably as temperature is increased, persisting up to above 100K and displaying a broad transition as previously seen in the susceptibility data. No spin gap is observed in the dispersive spin excitations at low momentum transfer, which we argue is consistent with Haldane physics in an ideal uniform S=1/2 spin-chain system.

[1]The work at the IBS CCES (South Korea) was supported by the research program of the Institute for Basic Science (IBS-R009-G1). Research at the Spallation Neutron Source was sponsored by the Scientific User Facilities Division, US Department of Energy.

Jonathan Leiner
Seoul National University

Date submitted: 11 Nov 2016 Electronic form version 1.4