

Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Magnetic Phase Diagram and Specific Heat of the Quasi-Two-Dimensional $S=1/2$ Antiferromagnet Cs_2CuBr_4 YASU TAKANO, University of Florida, HIROYUKI TSUJII, RIKEN, COSTEL ROTUNDU, BOHDAN ANDRAKA, University of Florida, TOSHIO ONO, Tokyo Institute of Technology, HIDEKAZU TANAKA, Tokyo Institute of Technology — Cs_2CuBr_4 is an excellent laboratory model for the $S=1/2$ Heisenberg antiferromagnet on a triangular lattice, with a small anisotropy. In a magnetic field, the most distinguishing feature of this antiferromagnet is a magnetization plateau, which occurs at $1/3$ of the saturation magnetization. We have determined the magnetic phase diagram of Cs_2CuBr_4 for magnetic fields up to 20 T, using specific-heat measurements and the magnetocaloric effect. We find that the ordering temperature in the plateau region is slightly higher than in the surrounding regions of the phase diagram. The transition to the plateau phase is first order, if it is from the adjacent ordered phase at either lower or higher magnetic fields, whereas the transition from the high-temperature disordered phase is second order. Surprisingly, the temperature dependence of the specific heat indicates that the excitations in the plateau phase are gapless.

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Date submitted: 10 Feb 2005

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