Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

New ordered phases of the spin-1/2 triangular-lattice antiferromagnet Cs_2CuBr_4 NATHANAEL FORTUNE, Smith College, SCOTT HANNAHS, National High Magnetic Field Laboratory, YASUO YOSHIDA, YASU TAKANO, University of Florida, TOSHIO ONO, HIDEKAZU TANAKA, Tokyo Institute of Technology — Quantum fluctuations and geometric frustration are theoretically expected to produce a gapped, collinear 'up-up-down' phase in spin-1/2 Heisenberg and XY antiferromagnets on a triangular lattice. Experimentally, this phase should manifest itself as a magnetization plateau at 1/3 of the saturation value. Despite being a fundamental theoretical property of such systems, this behavior has to date only been observed in one triangular lattice antiferromagnet: Cs_2CuBr_4. We have investigated the magnetic phase diagram of this compound by means of specific-heat, magnetocaloric-effect, and magnetic-torque measurements in magnetic fields up to the saturation field of about 30 T, finding a cascade of new ordered phases adjacent to the up-up-down phase. The evolution of these phases as a function of the field orientation with respect to the crystallographic bc plane suggests that they arise from the competition between the scalar exchange interaction and the symmetry-breaking Dzyaloshinskii-Moriya interaction.

Nathanael Fortune
Smith College

Date submitted: 27 Dec 2007 Electronic form version 1.4