Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Geometrical frustration in colloidal "antiferromanget"[1] YILONG HAN, Hong Kong University of Science and Technology, YAIR SHOKEF, AHMED ALSAYED, PETER YUNKER, TOM LUBENSKY, ARJUN YODH, University of Pennsylvania — We report experiments about a self-organized colloidal system that exhibits geometrical frustration similar to that of antiferromagnetic Ising spins on a triangular lattice. Novel thermally sensitive microgel NIPA (N-isopropyl acrylamide) spheres are close packed between two parallel flat walls with a vertical separation of about 1.5-particle diameters. The particles form an approximate in-plane triangular lattice. Neighboring particles tend to push each other toward opposite walls leading to out-of-plane local up and down buckling. We tune the strength of such effective antiferromagnetic interactions by varying temperature-tunable diameter of spheres. "Spin" flipping was directly visualized with video microscopy. We investigated the static structures, the dynamics of particles with different degrees of frustration and the degenerated ground state. This experiment is the first dynamic measurement in a geometrical frustrated system at single-particle resolution.

[1]This work is supported by the MRSEC grant DMR-0520020 and NSF grant DMR-0505048.

Yilong Han
Hong Kong University of Science and Technology

Date submitted: 12 Nov 2007 Electronic form version 1.4