Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

**Geometrical frustration in a regular lattice of nanoscale ferromagnetic islands: artificial spin ice** R.F. WANG, C. NISOLI, R.S. FREITAS, J. LI, W. MCCONVILLE, B.J. COOLEY, N. SAMARTH, V.H. CRESPI, P. SCHIFFER, Department of Physics and Materials Research Institute, Pennsylvania State University, University Park, PA 16802 USA, M.S. LUND, C. LEIGHTON, Department of Chemical Engineering and Materials Science, University of Minnesota, Minneapolis MN 55455 USA — We studied frustration in lithographically defined lattices of permalloy islands with lattice geometry designed so that the dipolar interactions are analogous to those of the spin ice materials. These islands are approximately 80 nm by 220 nm laterally and 25 nm in thickness, and the array lattice constant ranges from 320 nm to 880 nm. Our MFM measurements demonstrated that the single domain magnetic moment of individual islands had short range correlations but no long range correlations. The correlations showed behavior consistent with the ice rules for this system, which decreased with increased spacing between the islands. Research was supported by the Army Research Office.

Reference:
R. F. Wang et al. (Nature, in press).

Ruifang Wang
Penn State University

Date submitted: 01 Dec 2005 Electronic form version 1.4