Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Nearest neighbor correlations in perpendicular artificial spin ice arrays in the presence of an applied field SUSAN KEMPINGER, ROBERT FRALEIGH, PAUL LAMMERT, VINCENT CRESPI, NITIN SAMARTH, Pennsylvania State University, PETER SCHIFFER, University of Illinois — By studying the field dependent magnetization switching process in perpendicular artificial spin ice arrays arrays, we hope to gain insight in to the dynamical properties of interacting spin systems. To this end, we have used diffraction-limited Kerr imaging to study lithographically patterned arrays of single domain, nanoscale islands of Co/Pt multilayers. We can tune the interaction strength and introduce geometric frustration in to the patterned systems by changing the lattice spacing and geometry of the arrays. Using MOKE microscopy we are able to optically resolve, spatially isolate, and extract the switching field of each island in an array in the presence of an external field. These switching fields allow us to calculate the magnetization and nearest neighbor spin-spin correlation throughout a hysteresis loop. These quantities help us determine the effect of increased interactions and geometric frustration on the switching process of dipole coupled arrays. Funded by DOE.

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Date submitted: 05 Nov 2015 Electronic form version 1.4