Abstract Submitted
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Field annealing study of a frustrated interacting nanomagnet array[1] X. KE, J. LI, W. MCCONVILLE, R. WANG, C. NISOLI, P. LAMMERT, V. CRESPI, P. SCHIFFER, Dept. of Physics and Materials Research Institute, Pennsylvania State University, University Park, PA, 16802 — Lithographically patterned ferromagnetic nano-islands provide an ideal model to explore the physics of frustrated 'spin ice' materials due to the competition of dipole interaction between elements [1]. Since the energy scales are large compared to thermal energies, field annealing is crucial to obtaining a low-energy demagnetized state among the interacting islands. We have studied various field annealing protocols to demagnetize the array by rotating the sample in a time-varying magnetic field. We find that reversing the field direction while stepping down the field magnitude is needed to successfully demagnetize the array. The annealing can also be tuned by varying the field step size, especially for field magnitudes near the coercive field of the array. The competition of dipole interaction with external field and dipole field of neighboring elements will be discussed.
[1] R. Wang, et al, Nature **439**, 303 (2006).

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