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Quantifying the effects of disorder on switching of perpendicular spin ice arrays SUSAN KEMPINGER, ROBERT FRALEIGH, PAUL LAMMERT, VINCENT CRESPI, NITIN SAMARTH, Pennsylvania State University, SHENG ZHANG, Argonne National Lab, PETER SCHIFFER, University of Illinois at Urbana Champaign — There is much contemporary interest in probing custom designed, frustrated systems such as artificial spin ice. To that end, we study arrays of lithographically patterned, single-domain Pt/Co multilayer islands. Due to the perpendicular anisotropy of these materials, we are able to use diffraction-limited magneto-optical Kerr effect microscopy to access the magnetic state in situ with an applied field. As we tune the interaction strength by adjusting the lattice spacing, we observe the switching field distribution broadening with increasing dipolar interactions. Using a simple mathematical analysis we extract the intrinsic disorder (the disorder that would be present without interactions) from these switching field distributions. We also characterize the intrinsic disorder by systematically removing neighbor effects from the switching field distribution. Understanding this disorder contribution as well as the interaction strength allows us to more accurately characterize the moment correlation. This project was funded by the US Department of Energy, Office of Basic Energy Sciences, Materials Sciences and Engineering Division under Grant No. DE- SC0010778

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