Abstract Submitted for the MAR12 Meeting of The American Physical Society

A Symmetry Microscope for Disordered Materials DANIEL PARKS, Department of Physics, University of Oregon, KEOKI SEU, Advanced Light Source, Lawrence Berkeley National Lab, RUN SU, Department of Physics, University of Oregon, ERIC FULLERTON, ERIK SHIPTON, Electrical and Computer Engineering, UC San Diego, SUJOY ROY, Advanced Light Source, Lawrence Berkeley National Lab, STEVE KEVAN, Department of Physics, University of Oregon — We use position-resolved coherent speckle patterns in concert with rotational x-ray autocorrelation analysis to uncover "hidden" ordering at specific length scales in labyrinthine magnetic domains. Central to this measurement is understanding how finite-size effects influence the statistics of rotational cross-correlations. To this end, we present numerical simulations of domain configurations whose speckle patterns display rotational ordering similar to experimental candidates, and examine how the realspace structure of ordered and disordered domains differs. In a scanning measurement, we observe what appears to be an island of ordering in an otherwise disordered perpendicular magnetic thin film.

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Date submitted: 09 Nov 2011

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