

Abstract Submitted  
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**Investigating the origin of the magnetic switching field distribution in bit patterned media** OLAV HELLWIG, San Jose Research Center, Hitachi GST, BASTIAN PFAU, CHRISTIAN GUENTHER, Helmholtz-Zentrum Berlin, STEFAN EISEBITT, Technical University Berlin, THOMAS HAUET, Nancy University, ELIZABETH DOBISZ, XIAOYU XU, YANEY DEBORAH, San Jose Research Center, Hitachi GST — Bit patterned media (BPM) is a promising approach for extending densities in magnetic data storage. One critical challenge for BPM is a tight magnetic switching field distribution (SFD), i.e. the bit-to-bit variations in reversal field. The SFD has three components: the dipolar interactions between neighboring islands within the array, pattern non-uniformities, such as variations in island size, position or shape and the so-called intrinsic SFD of each individual island, which is due to variations in the intrinsic magnetic material properties. We use soft X-ray spectro-holography and high resolution transmission electron microscopy (TEM) to study the origin of the magnetic SFD in BPM. For this we fabricated pattern arrays with 80 nm islands by e-beam lithography and integrated these into a SiN membrane design suitable for x-ray transmission studies. After identifying individual easy and hard to switch islands in the tails of the SFD we performed plane-view TEM analysis of these islands and correlate their magnetic with their structural properties, such as misaligned grains or irregular island shapes.

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