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Origins of switching field distributions in nanopatterned Co/Pd multilayers[1] JUSTIN SHAW, WILLIAM RIPPARD, STEPHEN RUSSEK, NIST, TIMOTHY REITH, CHARLES FALCO, University of Arizona — We studied the reversal properties of perpendicularly magnetized nanodot arrays down to 50 nm in diameter. When continuous films undergo nanopatterning the phenomenon of a switching field distribution (SFD) becomes significant whereby the reversal fields from nanostructure-to-nanostructure vary. In applications such as patterned storage media, a broad SFD is undesirable since all nanostructures will not reliably switch at the same applied field. The origin of this phenomenon has been attributed primarily to grain boundary variations within a nanostructure as well as lithographic variations that occur during processing. While these two factors will certainly contribute to a larger SFD, we find that the primary origin of a SFD is an intrinsic material property of the continuous film. We will present our results of nanostructured Co/Pd exchange coupled multilayers. By changing the material properties using various seed layers and growth conditions, we were able to reduce the SFD to below 5 % of the average switching field. By studying both polycrystalline and epitaxial multilayers we isolated the effects of grain boundary variation since epitaxial nanostructures are all single grain with identical orientation.

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