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Nanofabrication as A Probe of Anisotropy Distribution in Co/Pd Multilayers BRUCE TERRIS, Hitachi San Jose Research Center, GUOHAN HU, Hitachi San Jose Research Center, THOMAS THOMSON, Hitachi San Jose Research Center — Arrays of patterned magnetic islands typically exhibit switching field distributions (SFD) which are much broader than those predicted based solely on the dipolar fields from neighboring islands. The source of the broad distributions is not understood. To determine if the source of the broad island SFD arises from intrinsic film properties or extrinsic sources we have fabricated arrays of Co/Pd islands with perpendicular anisotropy and sizes ranging from 30 nm to 5 μ m. The islands displayed single domain remanent states after easy axis saturation. The island array's coercivity and SFD increase with decreasing island size. The observed angle dependent switching fields closely resemble the behavior predicted by the Stoner-Wohlfarth model with a minimum at 45 degrees. This angle dependence is expected for small islands which may reverse by rotation, but is surprising for the larger islands. As expected, the continuous film exhibits the 1/cos dependence as predicted for domain wall motion controlled reversal. These data lead to a model whereby the reversal of the larger islands is controlled by a nucleation event, followed by a rapid wall motion. The observed switching field of the island is thus the switching field of the softest nucleation site in the island, and the distribution of these nucleation energies in the full grown film is the source of the island SFD.

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