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Determination of interfacial Dzyaloshinskii-Moriya exchange interaction from static domain size imaging PARNIKA AGRAWAL, IVAN LEMESH, MIT, SARAH SCHLOTTER, Harvard University, GEOFFREY BEACH, MIT — Dzyaloshinskii-Moriya interaction (DMI) has been identified [1-2] as a necessary ingredient for the formation of chiral spin structures such as skyrmions and Néel domain walls in perpendicularly magnetized thin films. Various simulation and experimental studies have tried to quantify DMI from domain wall [2] and skyrmion [3-4] motion with applied currents and magnetic fields. Here, a means to quantify DMI in multilayer films using only static magnetic characterizations is proposed. Static domain structure is observed using magnetic force microscopy (MFM) in multilayer stacks of $[\mathrm{Pt(2.5\text{-}7.5nm)/CoFeB(0.8nm)/MgO(1.5nm)}]_{15}$ where the thickness t_{pt} of the Pt layer is systematically varied from 2.5 nm to 7.5 nm. A variation of domain size from ˜300 nm to ˜70 nm is seen in the labyrinthine demagnetized state as t_{pt} is decreased. It is shown that the domain size as a function of t_{pt} can be well-fitted analytically by a model in which the domain wall energy is the sole free parameter. Additional measurements of magnetic anisotropy of the film reveal the significant contribution of interfacial DMI (˜1.4 $\mathrm{mJ/m^2}$) to the domain wall energy. Ref: 1.Fert et al., *Nat. Nanotech.*, 8, 152-156 (2013); 2. S. Emori et al., *Nature Materials* 12,611–616 (2013); 3. S. Woo et al., arXiv:1502.07376; 4.W. Jiang et al., arXiv:1502.08028v1

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