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Engineering of the anisotropy and Dzyaloshinskii-Moriya interaction energies in Pt-Co and Pt-Co-Cu heterostructures SARAH SCHLOTTER, Harvard University SEAS, GEOFFREY BEACH, Massachusetts Inst of Tech-MIT — It has previously been shown that perpendicular magnetic anisotropy is increased in Pt-Co-Pt structures by placing a Cu spacer between the top, diffuse Co-Pt interface.[1] However, including a spacer layer increases interfacial asymmetry in the system: a prerequisite for a strong Dzyaloshinskii-Moriya interaction (DMI) which governs helical spin structures such as skyrmions and chiral domain walls.[2] We show that the increased asymmetry significantly enhances DMI strength in Pt-Co-Cu-Pt heterostructures as compared to corresponding Pt-Co-Pt systems. We further show that one can control the characteristic length scales governing domain width by engineering the magnetostatic, anisotropy, and DMI energies in heavy-metal/ferromagnet heterostructures. These structures may provide insight into engineering the size of skyrmions in spintronic devices.

[1]S. Bandiera et al, **Appl. Phys. Lett.** 100, 142410 (2012)
[2]S. Emori et al, **Nature Mater.** 12, 611-616 (2013)

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