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Effects of domain wall width on current- and field-driven wall motion¹ G.S.D. BEACH, C. KNUTSON, M. TSOI, J.L. ERSKINE, Dept. of Physics, University of Texas at Austin — Magnetic domain wall motion can be driven by a magnetic field or by a spin-polarized electric current traversing the wall. The velocity of field-driven wall motion [1] depends on the details of the domain wall structure and varies in direct proportion to the wall width. By contrast, a current is predicted to augment the velocity of a domain wall by an amount that is *independent* of its structure. Using high-bandwidth scanning Kerr polarimetry, we have studied field- [1] and current-driven [2] wall dynamics in Permalloy nanowires whose widths span a broad range. Wall width is a function of the wire cross-sectional geometry, and the field-driven wall mobility varies in proportion to the calculated wall width. However, the mobility of current-driven motion also depends on wire geometry and is strongly correlated with the field-driven wall mobility. The results will be discussed in relation to available spin-torque models. [1] G. S. D. Beach, et al., Nature Mater. 4, 741 (2005) [2] G. S. D. Beach, et al., Phys. Rev. Lett. 97, 057203 (2006).

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