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Mobility of field and current-driven domain walls in magnetic nanowires G. S. D. BEACH, C. NISTOR, C. KNUTSON, M. TSOI, J. L. ERSKINE, Dept. of Physics, Univ. of Texas at Austin, Austin, TX 78712-1081 — Recent experiments [1] have demonstrated domain wall displacements in magnetic nanowires resulting from the injection of a spin-polarized current across the wall. These observations have been attributed to spin-momentum transfer. We present direct measurements of domain wall velocities in focused ion beam etched Permalloy nanowires using high spatial resolution scanning Kerr polarimetry with high-bandwidth detection (<2 ns risetime). The present experiments provide instantaneous measures of domain wall velocity during the entire course of wall propagation, in contrast to the average velocities determined in previous displacement studies [2]. We will report on field-driven domain wall velocity profiles and mobilities in magnetic nanowires, and the influence of dc spin currents on these dynamic quantities. The relation to various models will be discussed. Supported by NSF-DMR-0404252 and the R. A. Welch Foundation.

[1] M. Tsoi, et. al, Appl. Phys. Lett. 83, 2617 (2003)
[2] A. Yamaguchi, et. al, Phys. Rev. Lett. 92, 077205 (2004)

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