

Abstract Submitted
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Temperature dependence of domain wall dynamics in Permalloy nanowires JUSANG YANG, JAMES L. ERSKINE, Department of Physics, The University of Texas at Austin — Current-driven [1] and current-assisted field-driven [2] domain wall dynamics in ferromagnetic nanowires have the thermal effects resulting from Joule heating, which make difficult to separate the spin-torque effects on domain wall displacements. To understand the thermal effects on domain wall dynamics, temperature dependence of field-driven domain wall velocity was studied using high-bandwidth scanning Kerr polarimetry. Domain wall velocity curves of 20 nm thick Permalloy nanowires with various widths (from 400 nm to 1000 nm) were measured with increasing temperature from 300 K to 400 K. Walker critical fields decreased with increasing temperature, which can be attributed to thermal excitations, and temperature-induced stochastic dynamics mode changes were observed. The results will be discussed in relation to internal domain wall structures.

[1] M. Klaui et al., Phys. Rev. Lett. 95, 026601 (2005).

[2] G.S.D. Beach et al., Phys. Rev. Lett. 97, 057203 (2006).

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