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Thermal activation energy for domain wall motion in out-of-plane magnetized submicron strips SATORU EMORI, GEOFFREY BEACH, Massachusetts Institute of Technology — We have experimentally studied micrometer-scale domain wall (DW) motion driven by magnetic field and electric current in 500-nm wide out-of-plane magnetized Co/Pt multilayer strips with Co layer thicknesses 0.5-0.7 nm. The scaling of thermal activation energy for DW motion with driving field and current has been extracted directly from the temperature dependence of the DW velocity. For DWs driven by field, the activation energy follows creep and depinning dynamics below a critical field and collapses to zero above the critical field. DW motion assisted by current shows velocity enhancement independent of current polarity, but causes no measurable change in the activation energy barrier. Through this analysis, the observed current-induced DW velocity enhancement in these Co/Pt multilayer strips can be entirely and unambiguously attributed to Joule heating.

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