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**Nanometer Scale Observation of Current-Induced Narrow Domain Wall Depinning in Perpendicular Spin Valves** DAFINE RAVELOSONA, Hitachi San Jose Research Center, DANIEL LACOUR, Hitachi San Jose Research Center, JORDAN KATINE, BRUCE TERRIS — Until now, current driven domain wall (DW) motion in magnetic wires has been experimentally studied for in-plane magnetized films. Since the DW width is large (∼100 nm), only the adiabatic limit in which the current polarization follows the magnetization direction has been studied. Also, this wide DW masks any local variation in the pinning potential, thus making it difficult to probe the depinning process on a nanometer scale. Here, we report the first quantitative study of the depinning of a 1D narrow DW under a current. We use a 12nm wide Bloch DW in wires based on spin valves with perpendicular magnetic anisotropy. High sensitive electrical measurements allow us to observe current-induced DW motion between pinned sites separated by 10 nm. In spite of the strong pinning potential and narrow DW, a low critical current density of the order of 1x $10^7$ A/cm$^2$ is found. The study of the depinning process emphasizes the crucial role thermal fluctuations and the pinning potential play in current induced DW motion process.

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