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Manipulation of Magnetic Domain Walls in Patterned (Ga,Mn)As Devices ANDREW BALK, Dept. of Physics, The Pennsylvania State University, MENG ZHU, Dept. of Physics, Penn State University, NITIN SAMARTH, Dept. of Physics, The Pennsylvania State University , DAVID AWSCHALOM, Dept. of Physics, University of California, Santa Barbara — Ferromagnetic semiconductors such as (Ga,Mn)As provide new opportunities for the electrical manipulation of magnetic domain walls in a different regime of parameter space compared with ferromagnetic metals [Chiba et al, PRL 96, 096602 (2006)]. Here, we discuss different approaches to pinning and controlling magnetic domain walls in laterally patterned (Ga,Mn)As microdevices with perpendicular magnetic anisotropy. The pinning/depinning of domain walls is monitored using measurements of the magnetoresistance, the anomalous Hall effect and high speed Kerr microscopy. The domain wall pinning potential is engineered using a variety of schemes, including lateral shape engineering and lithographically integrated micromagnets. We find that even simple schemes (such as lateral notches) can significantly enhance domain wall pinning in relatively large (micron scale) devices. Supported by ONR MURI.

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