Spin transfer and spin-orbit torques in in-plane magnetized (Ga,Mn)As tracks

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Current-driven domain wall motion is investigated experimentally in in-plane magnetized GaMnAs tracks [1]. The wall dynamics is found to differ in two important ways with respect to perpendicularly magnetized GaMnAs or GaMnAsP: the wall mobilities are up to ten times higher and the walls move in the same direction as the hole current. We demonstrate that these observations cannot be explained by spin orbit field torques (Rashba and Dresselhaus types) but are consistent with non-adiabatic spin transfer torque driven by the strong spin-orbit coupling of GaMnAs. This mechanism opens the way to domain wall motion driven by intrinsic (bulk) rather than interface spin-orbit interaction as in ultrathin ferromagnet/heavy metal multilayers

References:

[1] L. Thevenard et al., Phys. Rev. B 95 054422 (2017)