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Spin Torque in Asymmetric CoFeB/MgO/FeB Magnetic Tunnel Junctions HSIN-WEI TSENG, Cornell University, YUN LI, Cornell Univ., JOHN READ, Hitachi Global Storage Technology, San Jose, CA, DANIEL RALPH, ROBERT BUHRMAN, Cornell Univ., CORNELL UNIV. TEAM, HITACH GLOBAL STORAGE TECHNOLOGY COLLABORATION — Recent studies have shown that the use of asymmetric electrodes in MTJs can significantly affect spin torque (ST) behavior. We will report on the measurement via spin torque ferromagnetic resonance (ST-FMR) and switching phase diagram (SPD) studies of the in-plane and field-like (out-of-plane) torkance of low resistance, asymmetric IrMn/FeB/MgO/FeCoB) and IrMn/FeCoB/MgO/FeB MTJ nanopillars in the as-grown state (TMR$\sim$22%) and the annealed state (TMR$\sim$90%), and in comparison to that of symmetric counterparts; IrMn/FeB/MgO/FeB) and Ir/Mn/FeCoB/MgO/FeCoB MTJs. For the asymmetric MTJs only,the ST-FMR data show a strong field-like torkance for low voltage bias V that reverses sign when the free and pinned layers are reversed. At the higher V regime explored by the SPD the equivalent linear term in the field-like torque can dominate over the in-plane torque, resulting in either the parallel or antiparallel alignment being favored for both bias polarities, depending on the composition of the free layer.

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