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Effect of asymmetry on the bias dependence of spin torque in magnetic tunnel junctions N. KIOUSSIS, Y. -H. TANG, ALAN KALITSOV, California State University, Northridge — The switching of magnetic states in magnetic tunnel junctions (MTJ) by spin-polarized current via the spin torque has been the subject of intensive theoretical and experimental researches. One outstanding question which remains unresolved and controversial is the bias dependence of field-like spin torque, T_{per}, perpendicular to the plane of the two magnetizations. In this study, we show that bias behavior of T_{per} can change dramatically with the asymmetry in the ferromagnetic electrodes from purely quadratic with negative curvature in agreement with Kubota's experimental results [1], to linear with sign reverse with bias in agreement of Li's observation [2], and finally to quadratic but with positive curvature in agreement with Sankey's experiments [3]. These results suggest that the asymmetry due to the amorphous alloys may cause the discrepancy in the bias dependence of T_{per} in experimental findings [1-3]. Moreover, our results have important practical applications for MRAM devices, since the magnetic configurations of MTJ can be tuned by external bias and without the application of external magnetic field. This work is supported by NSF PREM Grant No. DMR-00116566. [1] J. Kubota et al., Nature Phys. **4**, 37 (2008) [2] Z. Li et al., Phys. Rev. Lett. **100**, 246602 (2008) [3] J. C. Sankey et al., Nature Phys. **4**, 67 (2008).

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