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Spin-Transfer Torque in Double Barrier Magnetic Tunnel Junction. IOANNIS THEODONIS[1], ALAN KALITSOV, NICHOLAS KIOUSSIS, Department of Physics, California State University, Northridge — The transport properties in double-barrier magnetic tunnel junctions (DBMTJ) are determined by the spin polarized quantum well states(QWS) formed in the middle ferromagnetic(FM) region. Using tight-binding approach to the Keldysh formalism, we have studied the effect of the QWS on spin-transfer torque(STT) exerting on the middle FM region in non-collinear DBMTJ, with components parallel,$T_{||}$, and perpendicular,$T_{\perp}$, to the interface. Our results reveal that both *local* STT $T_{||(\perp),i}$exerting on atomic layer i in the middle FM region can be dramatically enhanced for values of the thickness of the middle FM region, b, for which spin-up and spin-down QWS are in close proximity to each other and lie within the bias window. This enhancement though, is cancelled out for the *total* STT, $T_{||(\perp)} = \sum_{i=1}^{b} T_{||(\perp),i}$ due to the oscillations of $T_{||,i}$and $T_{\perp,i}$, as a function of i. In addition we show that the bias dependence of $T_{||}$ for different b and different orientations of the magnetizations of the leads varies due to the QWS and symmetry respectively. We also show that the angular dependence of both $T_{||}$ and $T_{\perp}$deviates from the sinusoidal behavior. Interestingly$T_{\perp}$, which measures the non-equilibrium exchange coupling, exhibits an enhanced biquadratic term in its angular dependence.

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