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Spin-Transfer Torque in Double Barrier Magnetic Tunnel Junction. IOANNIS THEODONIS¹, 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_{\parallel} , and perpendicular, T_{\perp} , to the interface. Our results reveal that both *local* STT $T_{\parallel(\perp),i}$ 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, $T_{\parallel(\perp)} = \sum_{i=1}^b T_{\parallel(\perp),i}$ due to the oscillations of $T_{\parallel,i}$ and $T_{\perp,i}$, as a function of i . In addition we show that the bias dependence of T_{\parallel} 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_{\parallel} 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.

¹Department of Physics, National Technical University, GR-15773, Zografou, Athens, Greece

Ioannis Theodonis
Department of Physics, California State University, Northridge, CA 91330-8268

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