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Reducing the critical switching current of magnetic multilayers – an ab-initio approach. PAUL HANEY, U. Texas at Austin, DEREK WALDRON, McGill University, ALVARO NUNEZ, Instituto de Fisica, PUCV, REMBERT DUINE, Utrecht University, HONG GUO, McGill University, ALLAN MACDONALD, U. Texas at Austin — We examine strategies for reducing the critical switching current density of spin valve structures, including the dual spin filter (DSF) design, and the use of depolarizing materials outside of the magnetic layers. We study both ideas from first principles using the non-equilibrium Green's function formalism and direct microscopic evaluation [1] of spatially resolved spin transfer torque contributions. We compare the spin torques present in simple Co-Cu-Co sandwiches with those in the DSF structure. In addition we study the role of Ru layer in enhancing the spin transfer efficiency, exploring the physical origin of Ruthenium's apparent usefulness in microscopic detail. [1] Haney et al.. cond-mat/0611534

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