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Interfacial Effects in Spin Transport in Magnetic Tunnel Junctions TZEN ONG, Department of Applied Physics, Stanford University, BARBARA JONES, IBM Almaden Research Center, ANNICA HEYMAN, Department of Applied Physics, Stanford University, SHU PENG, Department of Mechanical Engineering, Stanford University — We have been looking at the spin-dependent tunneling in magnetic tunnel junctions (MTJ) using a position-dependent effective-mass Hamiltonian. Current-voltage curves and TMR values are calculated based upon analytical results, and include multiple band-to-multiple-band tunneling, to capture more realistically the main features of the band structure in cobalt and iron. The sign of the spin-current polarization is an outstanding issue in the field, and we believe that interfacial effects play a significant role. We have carried out DFT simulations of $Co/Al_2O_3/Co$ structures, assuming Al-termination at the interface, which show significant changes in the LDOS at the interface as compared to bulk. For simulations that include disorder at the interface, there is a change in spin-polarization of the LDOS, due to interfacial scattering and screening effects, going across the interface from the Co to the Al layer. This change in spin-polarization is reflected in our calculated I-V curves and TMR values.

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