First-principles study of magnetization relaxation enhancement and spin-transfer in thin magnetic films

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9.7 cm

The interface-induced magnetization damping of thin ferromagnetic films in contact with normal-metal layers is calculated from first principles for clean and disordered Fe/Au and Co/Cu interfaces. Interference effects arising from coherent scattering turn out to be very small, consistent with a very small magnetic coherence length. Because the mixing conductances which govern the spin transfer are to a good approximation real valued, the spin pumping can be described by an increased Gilbert damping factor but an unmodified gyromagnetic ratio. The results also confirm that the spin-current induced magnetization torque is an interface effect.

13.4 cm

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