CURRENT-INDUCED SPIN-TRANSFER TORQUE IN A NEEL DOMAIN WALL

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Spin polarized current flowing through a system with nonuniform magnetization leads to a local spin accumulation. This nonequilibrium spin density gives rise in turn to a spin torque exerted on the local magnetic moments. Physically, the spin torque appears due to transfer of angular momentum between the current and local magnetization. We consider the spin torque exerted on a relatively thick Neel domain wall in ferromagnetic metals. In the first step we perform transformation which removes the mangetization inhomogeneity. Then, making use of the adiabatic approximation we calculate in the linear response theory the nonequilibrium spin accumulation as well as the current-induced spin torque. We derive formulas for both the adiabatic and non-adiabatic spin torque components. Dependence of these components on both the exchange coupling of conduction electrons to the magnetization and the current polarization are analyzed and discussed.

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