SPIN TORQUE IN DOUBLE PLANAR TUNNEL JUNCTIONS

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9.7 cm

In ferromagnetic tunnel junctions with non-collinear orientations of magnetizations of the electrodes, a spin torque is generated due to a spin transfer from conduction electrons to localized magnetic moments. This torque can lead to the switching of magnetic configuration, which may be useful for applications in magnetic memories. Two components of the torque exerted on the central electrode of the double junction are analyzed in the free-electron-like model. The in-plane component lies in the plane determined by the magnetic moments, while the normal one is perpendicular to this plane. The torque depends on the orientation of magnetization in the central layer, described by the angle θ, and on the relative orientation of the leads' magnetizations. In junctions with a thick central layer and for small bias voltages, the magnitude of the in-plane torque is generally smaller in the parallel configuration of spins in the leads than in the antiparallel one. The opposite relation is observed for the normal torque. The spin torque depends strongly on the central layer thickness and can be essentially enhanced for special thickness of this layer. The θ dependence of the torque appears to be more complex than in single tunnel junctions.

13.4 cm

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