Spin torque characteristics for the asymmetric non-collinearly polarized ferromagnetic single-electron devices

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Spin-transfer torque due to spin polarized current, acting on the magnetic moment of central electrode (island) of a single-electron ferromagnetic transistor is calculated theoretically. The magnetic moments of the external electrodes are oriented non-collinearly with respect to the magnetic moment of the island. In an asymmetric situation under consideration, all the electrodes are made of different magnetic materials. The torque is calculated from the spin current absorbed by the island, and electric current flowing through the system is calculated in the sequential transport regime. The asymmetry in tunneling processes leads to spin accumulation when the spin relaxation time is sufficiently long, which is also taken into account when calculating the spin torque.

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