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Invariant Form of the Spin-Transfer Switching Condition INTI SODEMANN, YAROSLAW BAZALIY[1], Department of Physics and Astronomy, University of South Carolina, USA — Conventional spin-transfer (ST) device with one fixed and one free layer is considered in the macrospin approximation for the case of constant driving current. The expression for the critical current capable of pushing the free layer magnetization out of the local energy minimum is obtained in an invariant form. It is found that the relevant quantity is the divergence of the spin-transfer torque, and not the strength of the torque itself. This shows that there is no essential difference between current induced switching in collinear and non-collinear geometries. The result further provides a qualitative picture of the influence of ST torque angular dependence on the switching current and allows to understand when the Slonczewski spin polarization coefficient $g(\theta)$ can, or cannot be approximated by a constant. We discuss the implications of the derived formulas for the engineering of low current devices.

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