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Theory of current-induced torque in uniform ferromagnets

KAREL VYBORNY, LIVIU ZARBO, Institute of Physics, Academy of Sciences of the Czech Rep, T. JUNGWIRTH, Institute of Physics, Academy of Sciences of the Czech Rep; School of Physics and Astronomy, University of Nottingham — In a model ferromagnetic semiconductor (Ga,Mn)As with strong spin-orbit interaction, it has been experimentally shown that magnetization can be manipulated by injection of unpolarized currents [Chernyshov et al., Nat. Phys. 5, 656 (2009)]. We critically review the existing theoretical approaches to this phenomenon and present a model whose results are compared to more recent measurements of the current-induced torque driven by ferromagnetic resonance in (Ga,Mn)As. The results entail the dependence of the effect on carrier concentration, various types of strain, and temperature.

Karel Vyborny
Institute of Physics, Academy of Sciences of the Czech Rep

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