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Spin-orbit torques and charge pumping in YIG/Pt bilayers CECILIA HOLMQVIST, Department of Physics and Electrical Engineering, Linnaeus University, SE-391 82 Kalmar, Sweden, ARNE BRATAAS, Department of Physics, Norwegian University of Science and Technology, NO-7491 Trondheim, Norway —
Efficient control of magnetic elements using charge currents is essential for spintronics applications. The magnetization of a ferromagnetic insulator (FI) thin-film can be controlled by a current through an adjacent normal metal (N) thin film. We theoretically investigate the spin-orbit torques in Pt/YIG bilayers taking the crystal symmetries of the materials into account. Besides the damping torque in bilayers with $C_{\infty v}$ symmetry, the crystal symmetry of the clean Pt/YIG bi-layers also allows additional spin-orbit torque contributions. We show that the spin-orbit torque terms can be differentiated via charge pumping, in which the precession of a ferromagnet generates a charge current. The additional spin-orbit torque terms refine the understanding of the control of the magnetic moments

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