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Spin Torque Dynamics of Nanomagnets with Weak Magnetic Anisotropy HOANG YEN T. NGUYEN, XIAO CHENG, CARL BOONE, JIAN ZHU, ILYA KRIVOROTOV, Department of Physics and Astronomy, University of California, Irvine — We study switching and persistent precession of magnetization induced by spin transfer torque in Co(4 nm)/ Cu(6 nm)/ Co(0.7 nm)/Pt nanopillar spin valves where perpendicular magnetic anisotropy at the Co/Pt interface nearly cancels the easy-plane shape anisotropy of the free Co layer. We find that in this system with weak total magnetic anisotropy, spin torque can switch magnetization of the free layer between the in-plane and the out-of-plane static magnetic states. In the regime of current-driven persistent magnetization precession, we observe unusual non-monotonic dependence of the precession frequency on current. Simulations show that these unusual features of spin torque dynamics are due to the second-order perpendicular magnetic anisotropy term at the Co/Pt interface. Our work demonstrates a method for controllable switching of magnetization of a nanomagnet between stable in-plane and out-of-plane magnetic configurations by spin-polarized current.

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