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Control of magnetic damping and magnetic fluctuations by spin current YONG PU, CHI ZHANG, SERGEI MANUILOV, EZEKIEL JOHNSTON-HALPERIN, FENGYUAN YANG, CHRIS HAMMEL, The Ohio Sate University — We use spin hall effect in a non-magnetic film (NM) to generate spin current, which can excite magnetic precessions and manipulate magnetic properties of an adjacent ferromagnetic thin film (FM). We show that both magnetic damping and magnetic fluctuations can be sufficiently suppressed or enhanced by the spin current. We find that the magnetic damping is linear with spin current that is consistent with previous reports; on the other hand, the quasi-uniform precession and magnetic fluctuations show strongly nonlinear behaviors at driving current approaching critical value. The observations suggest that spin current interacts with all allowed spin-wave modes and induces strong nonlinear influence. Our results give an insight of the complex spin-torque driven dynamics in FM/NM systems and suggest a route to control the magnetic damping and magnetic fluctuations in nanodevices.

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