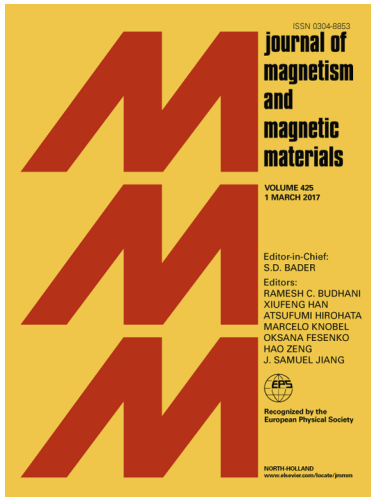

Research articles

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Enhanced spin-orbit torque in Pt/Co/Pt multilayers with inserting Ru layers

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Abstract: We report the enhancement of spin-orbit torque (SOT) in Pt/Co/Pt multilayers with inserting Ru layers. From current induced magnetization switching and harmonic measurements, we have found that both the damping-like and field-like effective fields increased with inserting Ru layers. The variation is firstly ascribed to the enhancement of the effective spin accumulation at the Co/Ru interfaces. Meanwhile, the interfacial Rashba effect has also been modulated, which depends on the direction of the internal electric field gradient at the interfaces. Our study provides an alternative way to modulate SOT.

Keywords: Spin-orbit coupling; Spin-orbit torques; Spin transport in metals

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1. Introduction

Spintronic devices, which use both the spin and charge properties of electrons, have attracted much attention due to its low energy consumption and high speed response. Instead of external magnetic field, spin-orbit torque (SOT) provides a new way to switch the magnetization of ferromagnetic metal (FM) films by applying electrical currents in contiguous heavy metal (HM) films [1-9]. This allows SOT