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Simulation of Oscillatory Domain Wall Motion Driven by Spin Waves in Nanostrip with Perpendicular Magnetic Anisotropy[1] SHANG FAN LEE, LIANG JUAN CHANG, Institute of Physics, Academia Sinica, SPINTRONICS LABORATORY TEAM — We numerically investigate the spin waves (SW) induced domain wall (DW) oscillatory motion in a nanostrip with perpendicular magnetic anisotropy by means of micromagnetic simulation. SW carries spin angular momentum and can interact with DWs via Spin Transfer Torque (STT). Propagating SW can drive a DW motion depending on the in-plane tilt angle φ of the wall magnetization. We calculate the instantaneous velocity of DWs as a function of $\varphi$with different SW frequency f. We find that the DW motion under propagating SW depends not only on the frequencies f, but also on the in-plane tilt angle φ. The nanostrip considered is 50 nm wide and 4000 nm long. A DW at the center is subjected to a SW source 500 nm apart on the left with amplitude in the transverse direction and varying frequency f. The motions of the DW induced by the SW are accompanied by in-plane rotation of magnetization of DW. Once rotated by 90 degrees, the DW shows a backward motion towards the SW source. The oscillatory amplitude and frequency of the DW motion is analyzed. A phase diagram will be presented. This study provides new perspectives for the control and manipulation of DW in a nanostrip.

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