Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Field-driven domain wall motion in ferromagnetic nanowires with Dzyaloshinskii-Moriya interaction ZHUO FENGJUN, SUN ZHOUZHOU, College of Physics, Optoelectronics and Energy Jiangsu Key Laboratory of Thin Films, Soochow University,China — Field-driven domain-wall (DW) motion in ferromagnetic nanowires with easy- and hard-axis anisotropies was studied theoretically and numerically in the presence of the Dzyaloshinskii-Moriya interaction (DMI) based on the Landau-Lifshitz-Gilbert equation. We proposed a new trial function and found the exact solution for the DW motion along a uniaxial nanowire driven by an external magnetic field. A new strategy was suggested to speed up the DW motion in a uniaxial magnetic nanowire with large DMI parameters. In the presence of the hard-axis anisotropy, we found that the breakdown field and velocity of the DW motion was strongly affected by the strength and sign of the DMI parameter under external fields. The work may be useful for future magnetic information storage devices based on the DW motion.

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Date submitted: 08 Oct 2015 Electronic form version 1.4