

Abstract Submitted  
for the MAR13 Meeting of  
The American Physical Society

**Domain wall propagation through spin wave emission** XIANSI WANG, Hong Kong University of Science and Technology, PENG YAN, Kavli Institute of NanoScience, Delft University of Technology, YUHUA SHEN, Hong Kong University of Science and Technology, G.E.W. BAUER, Kavli Institute of NanoScience, Delft University of Technology, X. R. WANG, Hong Kong University of Science and Technology — We theoretically study field-induced domain wall (DW) motion in an electrically insulating ferromagnet with hard- and easy-axis anisotropies. Different from the common wisdom, we prove that a DW in a dissipationless wire with a finite transverse magnetic anisotropy can propagate along the wire. The DW subjected to an external magnetic field undergoes a periodic transformation that excites SWs. The energy carried away must be compensated by the Zeeman energy that is released by DW propagation. Thus, a domain wall propagation mode through spin wave emission is revealed. The DW propagation locked into the known soliton velocity at low fields. In the presence of small damping, the usual Walker rigid-body propagation mode may become unstable for magnetic fields below the Walker breakdown.

Xiansi Wang  
Hong Kong University of Science and Technology

Date submitted: 02 Jan 2013

Electronic form version 1.4