Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Spinmotive force due to domain wall motion in high field regime JUN'ICHI IEDA, Advanced Science Research Center, JAEA; CREST, JST, YUTA YAMANE, Institute for Materials Research, Tohoku University, SADAMICHI MAEKAWA, Advanced Science Research Center, JAEA; CREST, JST — Spinmotive force associated with a moving vortex domain wall is investigated numerically. Dynamics of magnetization textures such as a domain wall exerts a non-conservative spin-force on conduction electrons [1], offering a new concept of magnetic devices [2]. This spinmotive force in permalloy nanowires has been detected by voltage measurement [3] where magnitude of the signal is limited less than 500 nV. Theoretically it is suggested that the spinmotive force signal increases as a function of external magnetic fields. At higher magnetic fields, however, the wall propagation mode becomes rather chaotic involving transformations of the wall structure and it remains to be seen how the spinmotive force appears. Numerical simulations show that the spinmotive force scales with the field even in a field range where the wall motion is no longer associated coherent precession. This feature has been tested in a recent experiment [4]. Further enhancement of the spinmotive force is explored by designing ferromagnetic nanostructures [5] and materials. [1] S. Barnes and S. Maekawa, PRL (2007). [2] S. Barnes, J. Ieda, and S. Maekawa, APL (2006). [3] S. A. Yang et al., PRL (2009). [4] M. Hayashi, J. Ieda et al., submitted. [5] Y. Yamane, J. Ieda et al., APEX (2011).

Jun'ichi Ieda
Advanced Science Research Center, JAEA; CREST, JST

Date submitted: 11 Nov 2011 Electronic form version 1.4