Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Transport Properties Characterized by Magnetic Domain-Wall Motion in Josephson Junction[1] MICHIYASU MORI, Japan Atomic Energy Agency, SIN-ICHI HIKINO, WATARU KOSHIBAE, RIKEN, Japan, SADAMICHI MAEKAWA, Japan Atomic Energy Agency — Nano-scale magnetic materials for spintronics devices are extensively studied due to many advantages. Non-volatile memory using a magnetic domain wall (DW) is one example of such devices, and the oscillatory DW is examined toward several applications. Once such devices are realized in a microscopic circuit, one needs to measure the DW motion more precisely. In this talk, we discuss the transport properties characterized by a magnetic domain wall (DW) motion in a ferromagnetic Josephson junction, which is composed of a ferromagnetic wire with DW and two superconducting electrodes. Our previous theory [1] is developed to include the DW motion into the Josephson current. By supposing a simplified DW structure, we find that the current-voltage curve exhibits stepwise structures, when DW oscillates in the ferromagnetic wire. The mechanism behind this result is common to the electric field generated by the vortex motion in the superconductor.

[1] S. Hikino, M. Mori, S. Takahashi, and S. Maekawa, J. Phys. Soc. Jpn, **77**, 053707 (2008).

[1]Grants-in-Aid for Scientific Research from MEXT (No. 19204035, No. 21360043, No. 22102501), the "K" computer project of Nanoscience Program, JST-CREST, and FIRST Program.

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Date submitted: 26 Nov 2011 Electronic form version 1.4