Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Domain Wall structures in wide permalloy strips VIRGINIA ESTEVEZ, LASSE LAURSON, COMP Centre of Excellence and Helsinki Institute of Physics, Department of Applied Physics, Aalto University — We analyze numerically the equilibrium micromagnetic domain wall structures encountered in Permalloy strips of a wide range of thicknesses and widths, with strip widths up to several micrometers. By performing an extensive set of micromagnetic simulations, we show that the equilibrium phase diagram of the domain wall structures exhibits in addition to the previously found structures (symmetric and asymmetric transverse wall and vortex wall) also a double-vortex domain wall for large enough strip widths and thicknesses. In general, shape anisotropy is less important for wider strips, and thus energy minima with more complex spin structures closing the flux more efficiently than those found before for narrow strips may appear. Also several metastable domain wall structures are found, such as structures with three or four vortices or two vortices and an antivortex. We discuss the details of the relaxation process, including the effect of varying the magnitude of the Gilbert damping constant, and the role of using different initial conditions. Finally, we also consider the field-driven dynamics of the double-vortex domain wall.

Virginia Estevez
COMP Centre of Excellence and Helsinki Institute of Physics,
Department of Applied Physics, Aalto University

Date submitted: 14 Nov 2014 Electronic form version 1.4