Magnetization Reversal in Cylindrical Wire with Helical Anisotropy

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Abstract. A new experimental set-up is presented for studying single domain wall propagation in cylindrical amorphous $Co_{72.5}Si_{12.5}B_{15}$ wire with helical anisotropy created by simultaneous application of tensile and torsion stresses. It is shown that conditions may be created for propagation of a single domain wall driven by electric current (circular magnetic field) in this type of sample. Even with constant electric current the wall velocity is not constant along the wire, probably due to the presence of inhomogeneities. The average wall velocity determined from the experiment is a linear function of the driving electric current, from which the domain wall mobility can be determined. Its magnitude is much higher than the mobility calculated for the model of a planar domain wall between circular domains. The axial component of magnetization is not equal to zero in wire with helical anisotropy. The balance between magnetostatic energy and domain wall energy can cause the domain wall to have non-zero axial length, and this may result in the increase in the domain wall mobility.

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