DYNAMICS OF 180° NÉEL WALLS IN TWO-DIMENSIONAL PERMALLOY PARTICLES OBSERVED VIA PICOSECOND TIME-RESOLVED PHOTOEMISSION ELECTRON MICROSCOPY

A. Krasyuk[1], *F. Wegelin*[1], *S.A. Nepijko*[1,2], *H.J. Elmers*[1], *G. Schönhense*[1], *I. Mönch*[3], *H. Vinzelberg*[3], *C.M. Schneider*[4]

[1]Institute of Physics, University Mainz (*7, Staudingerweg, Mainz 55099, Germany*),
[2]Institute of Physics, Nat. Acad. of Sci. of Ukraine (*46, Prosp. Nauky, Kyiv 03028, Ukraine*),
[3]Institute of Solid State and Material Research Dresden (*20, Helmholtzstr., Dresden 01069, Germany*),
[4]Institute of Solid State Research IFF-6, Electronic Properties, Research Centre Jülich (*52425, Jülich, Germany*)

S u m m a r y

Stroboscopic pump-probe measurements (a time-resolution of about 10 ps) have been conducted on a photoemission electron microscope by using the synchrotron radiation source UE46-PGM beamline at BESSY-II (Berlin) with low alpha bunch option (a photon pulse was characterized by the root mean square of 3 ps, and the repetition rate was 0.5 GHz). This technique was applied to studying the dynamics of 180° Néel walls between domains in rectangular permalloy ($Ni_{81}Fe_{19}$) particles (their lateral sizes comprised 16 μm $\times$ 32 μm, the thickness amounted to 10 nm) due to the action of an external magnetic field being a sum of pulse and constant magnetic fields directed oppositely. The velocity of 180° Néel walls comprises $\sim 10^3$ m/s, when the rate of change (increase) of a magnetic field is 1.2×10^6 T/s. The remagnetization fundamental frequency is estimated to be ~ 1.25 GHz.