Motion of domain walls in pulsed magnetic fields in iron garnet crystal plates

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Results of experimental study and numerical modelling of domain walls (DWs) motion in periodic alternating pulsed magnetic fields with frequencies 0,5-500 Hz are reported for uniaxial iron garnet plate $(TbErGd)_3(FeAl)_5O_{12}$ (thickness $L = 73\mu m$, saturation magnetization $M_S = 40Gs$, quality factor $Q = K_u/(2\pi M_S^2) = 0,55$) with stripe domain structure drift [1] observed at field amplitude H_{dr}. DWs reaction to pulsed magnetic fields was studied using stroboscopic technique. It was established experimentally that field impulses with amplitudes below H_{dr} result in larger shift of DWs from equilibrium in the direction of the drift in the plate than in the opposite direction. Numerical model takes anisotropy of attenuation into account. Simulations show that anisotropy of attenuation with respect to direction leads to DWs drift in harmonic and pulsed magnetic fields as well as to the difference in DW shifts in the direction of the drift and in the opposite direction.

References:

[1] Pamyatnykh L.A. et al., Acta Physica Polonica A, (2015), V. 127, l. 2, P. 388-390.

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