Experimental and Theoretical Study of Stripe Magnetic Domain Structure Drift in Iron Garnet Crystals

L.A. Pamyatnykh,[1] G.A. Shmatov,[1] S.E. Pamyatnykh,[1] M.S. Lysov,[1] D.S. Mehonoshin,[1] and A.V. Druzhinin[1]

[1] *Ural Federal University, Lenin Av. 51, Yekaterinburg, 620083, Russia*

The results of study of magnetic domain structure drift in oscillating magnetic field $H = H_o sin(2\pi ft)$ oriented perpendicular to iron garnet $(TbErGd)_3(FeAl)_5O_{12}$ (111) and (110) sample plates are presented. The field frequency was changed from 30 to 1000 Hz with amplitudes up to 500 Oe. Dynamic domain structure was revealed by means of magnetooptic Faraday effect and registered by high speed digital camera with speeds up to 2000 fps. Theoretical study of stripe domain structure drift was performed based on the approach developed in [1, 2]. The model includes energy of external magnetic field, magnetostatic energy and attenuation. Numerical modelling was performed for a wide frequency band including low frequencies ($f \sim 10^2$ Hz), where the drift is observed experimentally. A mechanism of domain structure drift is discussed.

References:

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