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Enhancement in Magnetoelectric Effects at Thickness Modes of Layered Ferromagnets and Ferroelectrics D.A. FILIPPOV, M.I. BICHURIN, V.M. PETROV, Novgorod State University, Russia, V.M. LALETSIN, Inst. Tech. Acoustics, Belarus, G. SRINIVASAN, Oakland University, C.W. NAN, Tsinghua University, China — Magnetoelectric (ME) effects in magnetic - piezoelectric heterostructures are caused by mechanical coupling between magnetic and piezoelectric layers. We reported earlier on the theory and observation of a resonant enhancement in the ME effects when the electrical subsystem is driven to resonance, i.e., electromechanical resonance (EMR) associated with radial acoustic modes [1]. Here we discuss the theory and data for ME effects associated with thickness EMR modes. Profiles of ME voltage coefficients versus frequency were estimated for trilayers based lead zirconate titanate and the following ferromagnetic phases: cobalt ferrite, nickel ferrite and lithium ferrite and Fe, Co and Ni. The results are compared with data on samples 10 mm in diameter and 2 mm in thickness. An enhacement in the ME voltage due to radial modes is observed at 350 kHz. A similar behavior due to the thickness mode is observed at 1.5-2 MHz, in agreement with the theory. Calculated ME voltage coefficients versus frequency profiles are in excellent agreement with data. - supported by an NSF grant.

[1] D. A. Filippov, M. I. Bichurin, V. M. Petrov, V. M. Laletin, G. Srinivasan, Phys. Solid State **46**, 1674, (2004).

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