Abstract Submitted
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Microwave Magnetoelectric Coupling in Ferromagnetic-Piezoelectric Nanostructures[1] YU.J. PUKINSKY, M.I. BICHURIN, V.M. PETROV, A.V. FILIPPOV, S.V. BELY, Novgorod State Univ. Russia, G. SRINIVASAN, Oakland Univ., MI — A theory is presented on the effect of an external electric field on ferromagnetic resonance (FMR) spectra of nanobilayers, nanopillars and nanowires of ferrite and piezoelectrics on MgO or gadolinium gallium garnet substrates. Expressions have been obtained relating the FMR line shift to ME coupling constants. Estimates of ME coupling constants are given. With increasing substrate thickness, the theory predicts a decrease in the ME interaction due to the clamping effect. The strongest ME coupling is expected for ferrite nanopillars in a piezoelectric matrix when the pillar height is large compared to substrate thickness. Numerical estimations are obtained for nanostructures of nickel ferrite and PZT or PMN-PT, yttrium iron garnet and PZT or PMN-PT on MgO or gadolinium gallium garnet substrates. The theory is useful for measurements of ME constants and for the design and analysis of electrically controlled high frequency devices.

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