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Inverse magnetoelectric effects in a bilayer of ferrite and graded piezoelectric VLADIMIR PETROV, Novgorod State University, GOPALAN SRINIVASAN, Oakland University — Magnetoelectric (ME) effects in a piezoelectric-magnetostrictive composite are mediated by mechanical stress. An applied electric field, for example, will result in piezoelectric strain in the composite and will lead to shift in ferromagnetic resonance (FMR) in the ferrite. This work is on modeling of magnetoelectric interactions under FMR in a bilayer of ferrite and functionally graded piezoelectric. We show that an enhancement of the strength of ME interaction at FMR is possible with the use of piezoelectric coefficient-graded ferroelectric with the grading axis perpendicular to the sample plane. In this case, the thickness dependence of the piezoelectric coefficients leads to an additional bending strain, resulting in an increase in the FMR line shift. Expressions have been obtained for the electrically induced magnetic resonance line shift, taking into account the effect of grading and substrate clamping. The obtained results are applied to the cases of single crystal yttrium iron garnet (YIG) and graded lead magnesium niobate-lead titanate (PMN-PT). A 40 % increase in the shift of FMR line is predicted for graded systems compared to homogeneous piezoelectric composition.

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