

Abstract Submitted
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Magnetic field gradient induced magnetoelectric response of piezoelectric-magnetostrictive laminates¹ GOPALAN SRINIVASAN, Oakland University, VLADIMIR PETROV, Novgorod State University — Magnetoelectric (ME) effects in a piezoelectric-magnetostrictive composite are mediated by the mechanical stress. The ME coupling in composites when subjected to a bias magnetic field and an ac magnetic field leads to an induced voltage that is directly proportional to the applied ac magnetic field amplitude. We discuss here the theory of ME interactions in a piezoelectric-magnetostrictive laminate which is subjected to a non-uniform bias magnetic field. The model predicts that the induced ME voltage will include an additional term which is proportional to the field gradient provided that the gradient direction is perpendicular to the laminate plane. The supplementary term in the ME voltage can be attributed to flexural deformations due to stress irregularity in the magnetostrictive component. As an example, the gradient magnetic field induced ME effect is considered for a bilayer of Terfenol-D and lead zirconate titanate. The ME voltage coefficient at electromechanical resonance is expected to exceed the low-frequency value by two orders of magnitude.

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