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Elastic Coupling at Epitaxial Multiferroic Interfaces: *in situ* X-ray Studies of Electric Field Induced Strain

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The elastic coupling in multiferroic materials and even more so in magnetoelectric composites plays an important role for the properties and function. In this study, the electrically induced strain at the epitaxial interface of $0.72\text{Pb}(\text{Mn}_{1/3}\text{Nb}_{2/3})\text{O}_3$ - 0.28PbTiO_3 — CoFe_2O_4 , a magnetoelectric composite, is characterized by *in situ* X-ray scattering experiment and transmission electron microscopy study. For the measured range all strain induced lattice changes are reversible ruling out plastic deformation. The surprisingly non-perfect elastic coupling of $87\% \pm 7\%$ in this epitaxial system can be explained by the presence of planar defects in the CFO film.