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Polarization switching and dielectric properties of ferroelectric bilayers MANDANA MEISAMI AZAD, The University of Tulsa, DANIEL TINBERG, The Pennsylvania State University, DONALD WALKO, Argonne National Laboratory, SUSAN TROLIER-MCKINSTRY, The Pennsylvania State University, ALEXEI GRIGORIEV, The University of Tulsa — In this work, we analyze polarization switching and dielectric properties of ferroelectric multilayer thin films of lead zirconate titanate. The interlayer coupling and polarization dynamics of ferroelectric multilayers are largely unknown. The studies of multilayers present a significant interest due to both fundamental understanding of interlayer interactions and practical applications of ferroelectrics in nanoelectronics and nanoelectromechanical systems. It is predicted that unusual switching characteristics and domain configurations such as the antiparallel alignment of the spontaneous polarization in adjacent layers can be observed in these materials. Using electrical measurements and time-resolved x-ray microdiffraction we analyzed physical properties of $PbZr_{0.8}Ti_{0.2}O_3/PbZr_{0.6}Ti_{0.4}O_3$. Strong nonlinearities in piezoelectric and dielectric responses of the bilayer to applied electric fields, which were observed in our experiments, can be explained by unusual polarization domain dynamics and interface charging effects.

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