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Properties of ferroelectric multilayer materials MANDANA MEISAMIAZAD, ALEXEI GRIGORIEV, The University of Tulsa, DANIEL TINBERG, SUSAN TROLIER-MCKINSTRY, The Pennsylvania State University, TARA DWENSKI, The University of Tulsa, DONALD WALKO, Argonne National Laboratory — In this work, we analyze polarization switching and elastic strain properties of ferroelectric multilayer materials. These properties depend on electrostatic coupling between ferroelectric layers. The coupling can be affected by the dielectric properties and geometry of individual ferroelectric layers and by the electrical charges at the interfaces between the layers. The goal is to describe the properties of a ferroelectric multilayer system using the Landau-Ginzburg-Devonshire theory and compare the calculations with the results of piezoelectric strain measurements by time-resolved X-ray diffraction. The potential implications of our work in nanoelectronics and nanoelectromechanical systems include the development of new multistate memory devices and advanced piezoelectric materials.

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