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Artificially layered $PbTiO_3/BaTiO_3$ superlattices BENEDIKT ZIEGLER, SARA CALLORI, JOHN SINSHEIMER, MATTHEW DAWBER, Dept of Physics and Astronomy, Stony Brook University — Artificially layered superlattices of ferroelectric oxides provide an appealing route for the tailoring of materials to particular applications [1] by taking advantage of electrostatics, strain and more exotic interactions between different materials at interfaces [2]. First principles calculations [3] suggest that the piezoelectric properties can be enhanced at certain ratios of layer thicknesses in the $PbTiO_3/BaTiO_3$ superlattice system. We have fabricated high quality artificially layered $PbTiO_3/BaTiO_3$ superlattices on $SrTiO_3$ substrates (with $SrRuO_3$ electrodes) using an off-axis RF magnetron sputtering technique, allowing us to perform a range of experiments, including x-diffraction, electrical measurements and atomic force microscopy. We will discuss our experimental results and their relationship with the theoretical expectations for this system and highlight the potential of using a superlattice approach to create enhanced materials for piezoelectric applications. **References** [1] M. Dawber, N. Stucki, C. Lichtensteiger, S. Gariglio, P. Ghosez and J.-M. Triscone, Advanced Materials, 19, 4153 (2007). [2] E. Bousquet, M. Dawber, N. Stucki, C. Lichtensteiger, P. Hermet, S.Gariglio, J.-M. Triscone, and P. Ghosez, Nature, 452, 732 (2008). [3] V. R. Cooper and K. M. Rabe, Phys. Rev. B 79, 180101 (R) (2009)

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