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A Direct Determination of the Structure of Polar SrTiO3 on Silicon DIVINE KUMAH, JAMES REINER, YARON SEGAL, Center for Research on Interface Structure and Phenomena and Department of Applied Physics, Yale University, New Haven, CT, ZHAN ZHANG, Advanced Photon Source, Argonne National Laboratory, Argonne, IL, ALEXIE KOLPAK, SOHRAB ISMAIL-BEIGI, CHARLES AHN, FRED WALKER, Center for Research on Interface Structure and Phenomena and Department of Applied Physics, Yale University, New Haven, CT — The epitaxial growth of perovskite oxide structures on silicon substrates has opened the door for the integration of a wide range of novel physical properties unique to complex oxides with established silicon-based technologies. A model system is the polar SrTiO3/Si system. Synchrotron based x-ray diffraction measurements allow a direct determination of the structure of the SrTiO3-Si interface, as well as the atomic displacements in the SrTiO3 film. A combination of direct phasing methods and fitting algorithms is used to convert the diffraction data into sub-angstrom resolution real space structural maps. The results can be used to understand the polarization observed in the SrTiO3 thin films and the measured differences between 2.5 and 5 unit cell SrTiO3 deposited on Si.

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