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**Imaging Atomic-Scale Distortions at Buried Oxide Interfaces.**

DIVINE KUMAH, North Carolina State University

Electronic and magnetic interactions at the interfaces between transition metal complex oxide materials have led to the realization of a wide range of emergent properties. These properties include interfacial magnetism, superconductivity and high-mobility two dimensional electron gases and are directly linked to interfacial atomic-scale structural and chemical reconstructions. To understand and manipulate these emergent properties, we apply synchrotron-based surface diffraction and direct x-ray phase retrieval techniques to determine the atomic structures of crystalline complex oxide interfaces with picometer scale resolution. This talk will focus on how an understanding of the structure-property relationships at interfaces between doped manganites and SrTiO<sub>3</sub> can be used to control magnetic ordering and electronic transport in manganite films with thickness on the order of a unit cell.