

Abstract Submitted  
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**Spatial Charge Distribution in the  $\text{LaAlO}_3$ - $\text{SrTiO}_3$  Interface Measured by Angle Resolved Soft X-ray Absorption** A. ARIANDO, A. RUSYDI, X. WANG, T. VENKATESAN, NanoCore, National University of Singapore, J. HUIJBEN, H. HILGENKAMP, University of Twente, J. C. LEE, S. SMADICI, P. ABBAMONTE, Brookhaven National Laboratory and University of Illinois — At the interface between complex insulating oxides, novel phases with interesting properties occur. In particular, studies have recently shown high-mobility two-dimensional conducting planes emerge at the interface between insulating oxide heterostructures of  $\text{LaAlO}_3$  and  $\text{SrTiO}_3$ . Although this state has been predicted and reported to be confined at the interface, transport studies alone cannot measure the charge distribution since mobility may also vary spatially. A way to measure the charge distribution independent of mobility is needed. Here, we present for the first time a direct mapping of the spatial charge density distribution of this system through oxygen vacancy mapping about the interface between  $\text{LaAlO}_3/\text{SrTiO}_3$  layers prepared at various oxygen deposition partial pressures using angle resolved soft x-ray absorption. We find that, depending on specific growth protocols, the spatial extension of the oxygen vacancies (charges) can be varied from a 3d-like to a 2d-like distribution at the  $\text{LaAlO}_3/\text{SrTiO}_3$  interface.

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