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**Resonant Anomalous Synchrotron X-Ray Studies of $LaAlO_3$ Films on $SrTiO_3$(001)**[1] DILLON FONG, TIM FISTER, MARIE-INGRID RICHARD, STEPHAN HRUSZKEWYCZ, JEFFREY EASTMAN, PAUL FUOSS, Argonne National Laboratory, SUNG SEOK SEO, HO NYUNG LEE, Oak Ridge National Laboratory, ARGONNE NATIONAL LABORATORY TEAM, OAK RIDGE NATIONAL LABORATORY TEAM — The high conductivity present at the interface between $LaAlO_3$ and $TiO_2$-terminated $SrTiO_3$(001) has been attributed to an electronic reconstruction [1] or atomic intermixing [2], both induced by the polar discontinuity. $LaAlO_3$ films with thicknesses equal to or thinner than a critical thickness (three unit cells [3]), however, can maintain the interface dipole, and no reconstruction (electronic or atomic) is expected. In this study, we employ resonant anomalous x-ray scattering at the Ti K-edge to investigate the structure and properties of the $LaAlO_3$ films both above and below the critical thickness. For films thicker than the critical thickness, an interfacial layer is observed to form. The structure and chemical properties of the interfacial layer as determined by both resonant scattering and x-ray spectroscopy will be discussed.

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