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**Probing complex oxide interfaces by cross-sectional scanning tunneling microscopy**[1] TEYU CHIEN, Advanced Photon Source, Argonne National Laboratory, JIAN LIU, JACQUES CHAKHALIAN, Dept. of Physics, U. of Arkansas, NATHAN P. GUISINGER, Center for Nanoscale Materials, Argonne National Laboratory, JOHN W. FREELAND, Advanced Photon Source, Argonne National Laboratory — Recently, complex oxide materials have drawn tremendous attention, especially the new physics emerging at interfaces in oxide heterostructures. With the advent of oxide thin film synthesis, high-quality epitaxial thin films with sharp interfaces between different types of complex oxides can nowadays be grown routinely. While there exist many tools that can provide a spatial picture of the structural and chemical environment in oxide heterostructures, probes which can gain insight into the properties of carriers at interfaces are limited. By utilizing cross-sectional scanning tunneling microscopy (CS-STM), we have been able to create atomically flat terrace on non-cleavable Nb-doped $SrTiO_3$ routinely. Here, we present our initial results on oxide heterostructures with CS-STM, which is a crucial tool to reveal new physics emerging at oxide interfaces.

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