

Abstract Submitted
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Scanning Tunneling Microscopy of 2DEG in Complex Oxide Interfaces and Heterostructures IGOR ALTFEDER, Air Force Research Laboratory, HYUNGWOO LEE, University of Wisconsin-Madison, ALP SEHIRLIOGLU, Case Western Reserve University, CHANG-BEOM EOM, University of Wisconsin-Madison, ANDREY VOEVODIN, Air Force Research Laboratory — New experimental data clarifying the origin of 2DEG at LaAlO₃ (LAO) - SrTiO₃ (STO) interfaces will be presented. The materials that have been studied include (a) 4 unit cells of LAO on STO and (b) symmetric n-type 2DEG bilayer heterostructures prepared by atomic layer engineering method [1]. All studied materials are grown by pulsed laser deposition (PLD). UHV STM results obtained on 4LAO/STO samples do not confirm the prediction of electronic reconstruction model [2]. On the other hand, UHV STM results obtained on symmetric n-type 2DEG bilayer heterostructures indicate that the formation of n-type 2DEG is caused by complex interplay of oxygen vacancy doping and interfacial band bending at LaO-TiO₂ interfaces. The physical mechanisms of interface induced charge density multiplication effect will be discussed.

[1] H. W. Jang et al., Science 331, 886 (2011);

[2] Z. Ristic et al., Europhysics Letters 93, 17004 (2011).

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