

Abstract Submitted  
for the MAR15 Meeting of  
The American Physical Society

**LaAlO<sub>3</sub>/SrTiO<sub>3</sub> field-effect nanodevices using in-situ-grown Au top gates**<sup>1</sup> YUN-YI PAI, MENGCHEN HUANG, Univ of Pittsburgh, HYUNG-WOO LEE, CHANG-BEOM EOM, Univ of Wisconsin-Madison, PATRICK IRVIN, JEREMY LEVY, Univ of Pittsburgh — Conductive-atomic force microscope (c-AFM) lithography can create a wide range of nanostructures based on the LaAlO<sub>3</sub>/SrTiO<sub>3</sub> system, including field effect transistors<sup>2</sup>, single-electron transistors<sup>3</sup> and superconducting nanoelectronics<sup>4</sup>. However, the operating range of gated devices is often limited by tunneling through insulating barriers. Using in-situ Au deposited on top of LaAlO<sub>3</sub>, we create vertical field-effect devices with significantly lower leakage due to the large bandgap of LaAlO<sub>3</sub>. We describe the fabrication process for vertical field-effect nanodevices and show representative transport measurements both at room temperature and low temperatures.

<sup>1</sup>We gratefully acknowledge support for this work from NSF (DMR-1124131 and DMR-0704022 and DMR-1234096) and AFOSR (FA9550-10-1-0524 and FA9550-12-1-0342).

<sup>2</sup>C. Cen, S. Thiel, J. Mannhart, and J. Levy, *Science* **323**, 1026 (2009).

<sup>3</sup>G. L. Cheng, *et al.*, *Nature Nanotechnology* **6**, 343 (2011).

<sup>4</sup>J. P. Veazey, *et al.*, *Nanotechnology* **24**, 375201 (2013).

Yun-Yi Pai  
Univ of Pittsburgh

Date submitted: 14 Nov 2014

Electronic form version 1.4