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**Local 2D-2D tunneling in high mobility electron systems**

MATTHEW PELLICCIONE, ADAM SCIAMBI, JOHN BARTEL, DAVID GOLDHABER-GORDON, Stanford University, LOREN PFEIFFER, KEN WEST, Princeton University, MICHAEL LILLY, Sandia National Laboratory, SETH BANK, University of Texas, Austin, ARTHUR GOSSARD, University of California, Santa Barbara — Many scanning probe techniques have been utilized in recent years to measure local properties of high mobility two-dimensional (2D) electron systems in GaAs. However, most techniques lack the ability to tunnel into the buried 2D system and measure local spectroscopic information. We report scanning gate measurements on a bilayer GaAs/AlGaAs heterostructure that allows for a local modulation of tunneling between two 2D electron layers. We call this technique Virtual Scanning Tunneling Microscopy (VSTM) [1,2] as the influence of the scanning gate is analogous to an STM tip, except at a GaAs/AlGaAs interface instead of a surface. We will discuss the spectroscopic capabilities of the technique, and show preliminary results of measurements on a high mobility 2D electron system.

[1] A. Sciambi, M. Pelliccione *et al.*, Appl. Phys. Lett. **97**, 132103 (2010).

[2] A. Sciambi, M. Pelliccione *et al.*, Phys. Rev. B **84**, 085301 (2011).

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