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Virtual Scanning Tunneling Microscopy: A local spectroscopic probe of high mobility 2D electron systems MATTHEW PELLICCIONE, JOHN BARTEL, ADAM SCIAMBI, Stanford University, LOREN PFEIFFER, KEN WEST, Princeton University, DAVID GOLDHABER-GORDON, Stanford University — 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] as the influence of the scanning gate is analogous to an STM tip, except at a GaAs/AlGaAs interface instead of a surface. We present measurements that highlight the spatial resolution and spectroscopic capabilities of the technique.

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

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