

Abstract Submitted  
for the MAR10 Meeting of  
The American Physical Society

**Single Molecule Conductance Measurements at Low Temperatures in Ultra High Vacuum**<sup>1</sup> MASHA KAMENETSKA, Columbia University (CU), M. DELL'ANGELA, TASC National Laboratory, J. WIDAWSKY, CU, D. ACHARYA, CFN, Brookhaven National Labs, A. MORGANTE, TASC, M. HYBERTSEN, P. SUTTER, CFN, S. MODESTI, TASC, L. VENKATARAMAN, CU — We image and measure the conductance of 2,3,5,6 Tetramethyl-p-phenylenediamine on a single crystal Au(111) surface in an ultra high vacuum (UHV) chamber of a scanning tunneling microscope (STM) with a solid gold tip. Images reveal an ordered layer of molecules deposited on the surface. Single molecule conductance is measured by smashing the tip into the molecule-covered substrate until metal-to-metal contact is established and then pulling the tip out until tunneling conditions are reestablished. Current traces recorded while the junction is stretched reveal plateaus below  $1G_0$  due to the formation of single-molecule junctions between the sample and tip. Conductance histograms made from thousands of traces reveal a well-defined peak that agrees well with previous measurements in ambient conditions and allows an unambiguous measurement of single molecule conductance in UHV at temperatures from 50 to 300K. Scanning tunneling spectroscopy measurements are also presented and compared with IV measurements of single molecule junctions.

<sup>1</sup>Support: NSF-NSEC CHE0641532; Packard Foundation

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Date submitted: 20 Nov 2009

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