Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Atomic scale contact formation: A combined Scanning Tunneling Microscopy (STM) and Atomic Force Microscopy (AFM) study TILL HAGEDORN, MEHDI EL OUALI, YOICHI MIYAHARA, PETER GRÜTTER, Department of Physics, McGill University, Montreal, Canada — We are investigating contact formation at the atomic scale, in particular the interplay of forces and conductivity [1]. As it has been shown (e.g. in the case of C60 in between a STM tip and an Au(111) sample [2]), the conductivity in molecular junctions depends strongly on the contact geometry. In order to fully characterize the junction, we use a homebuilt ultra high vacuum (UHV) ($p < 10^{-10}$ mbar) microscope which runs in simultaneous scanning tunneling microscope (STM) and atomic force microscope (AFM) modes. Additionally we image the STM tip structure with field ion microscopy (FIM) prior to using it in our experiments [3]. In order to realize a controlled contact we use the STM tip as one electrode and the sample as counter electrode. We are investigating bare Au(111) samples and W STM tips as an example of a nano metal-metal contact and one C60 molecule sandwiched between the W-tip and the Au(111) sample as a model for a controlled metal-molecule-metal contact. We will present new measurements of I(z), F(z) and dI/dV (z) curves of the above mentioned systems, where z is the tip-sample separation as well as images of the sample and tip structure. [1] Sun et. al. PRB 71 193407, 2005 [2] De Menech et. al. PRB 73, 155407, 2006 [3] Lucier et. al. PRB 72, 235420, 2005

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Date submitted: 26 Nov 2007 Electronic form version 1.4