Contributed talk to be presented at American Vacuum Society 54th International Symposium in Seattle, WA on Tuesday, October 16, 2007, 9:00am, Room 616

9:00am **NS-TuM4 Measuring Atomic Size Objects on Electrically Insulating Surfaces in Ultrahigh Vacuum**, ***S.C. Fain***, *N. Ruzycki, J. Morales, T.C. Lovejoy, E.N. Yitamben, M.A. Olmstead, F.S. Ohuchi*, University of Washington

Frequency modulation non-contact atomic force microscopy (ncAFM) provides a way to measure atomic size objects on electrically insulating surfaces in ultrahigh vacuum. Computer simulations indicate that the apparent height of clusters one atomic layer high is much less than the actual height when the lateral extent of the cluster is much less than the tip radius.[1] For example the apparent height of a 1.4 nm diameter, one-atomic-layer-high cluster of 19 atoms on a flat surface is expected to be 12% of its actual height when imaged by a typical probe tip of 20 nm radius. The apparent height of the cluster is predicted to be much closer to the real height as the cluster height increases. We have performed measurements on semiconducting surfaces with various cluster sizes by both ncAFM and scanning tunneling microscopy (STM) using various probe tips. Evidence in qualitative agreement with the computer simulations has been obtained for clusters on a surface with Cr co-deposited with Ga_2Se_3 on Si(100):(2x1)As. We acknowledge support from NSF NER-0508216, NSF DMR-0605601, and an IGERT Traineeship to TCL from NSF and NCI grant DGE-0504573.

[1]S. C. Fain, Jr., C. A. Polwarth, S. L. Tait, C. T. Campbell, and R. H. French, Nanotechnology 17, S121-127 (2006).