Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

A joint first principles and Kelvin probe force microscopy study of stepped silicon surfaces with unprecedented resolution[1] STEFAN WIPPERMANN, Max-Planck-Institute for Iron Research, CARMEN PÉREZ LEÓN, HOLGER DREES, MICHAEL MARZ, REGINA HOFFMANN-VOGEL, Karlsruhe Institute of Technology — Stepped well-ordered surfaces are important nanotemplates for the fabrication of one-dimensional nanostructures with intriguing electronic properties. The vicinal Si(7710) surface is an important model system of this kind. It contains (7x7) reconstructed areas equivalent to the well characterized and understood Si(111)-(7x7) surface. Thereby this system essentially contains its own calibration, providing an ideal testbed for surface characterization techniques and understanding in depth the rich morphology of the structural features present in this system. Here we present a joint experimental and theoretical investigation of the structural properties of the vicinal Si(7710) surface. We carried out Kelvin probe force microscopy (KPFM) measurements with unprecedented atomic resolution, and *first principles* calculations of the local work function as a function of the lateral position of the tip above the surface. These calculations allowed us to interpret the experimental KPFM data in terms of specific structural features and electronic properties of surface states, such as e. g. defects, dangling bond angles and occupations of dangling bonds.

[1]R. H.-V. acknowledges ERC starting grant NANOCONTACTS No. ERC 2009-Stg 239838.

Stefan Wippermann
Max-Planck-Institute for Iron Research

Date submitted: 14 Nov 2014 Electronic form version 1.4