

Abstract Submitted  
for the MAR11 Meeting of  
The American Physical Society

**Revisiting Low-Temperature Reconstruction of  $\text{TiO}_2(001)$**  N.-H. YU, K.T. PARK, V.B. NASCIMENTO, Z. LIAO, G. LI, X. HE, J. TENG, J. ZHANG, E.W. PLUMMER, DEPARTMENT OF PHYSICS, BAYLOR UNIVERSITY TEAM, DEPARTMENT OF PHYSICS AND ASTRONOMY, LOUISIANA STATE UNIVERSITY TEAM —  $\text{TiO}_2(001)$  has been investigated by scanning tunneling microscopy (STM) and low energy electron diffraction (LEED). After cycles of Ar sputtering and surface annealing at moderate temperatures (up to  $600^\circ\text{C}$  for 15 minutes),  $\text{TiO}_2(001)$  reveals the so-called latticework reconstruction: row-like linear structures running along  $[110]$  and  $[1-10]$  directions. Each row further consists of bright spots separated by  $6.5\text{ \AA}$ . In some areas, the rows are separated by  $13\text{ \AA}$  consistent with the lattice domains of  $(2\sqrt{2}\times\sqrt{2})\text{ R}45$  observed by LEED. In other areas, the rows are distributed in a more random fashion. Thus various nearest neighbor distances and relative heights of the rows form different microfacets. From the LEED and STM data, the surface reconstruction is modeled by added rows of stoichiometric  $\text{TiO}_2$ , aligned along  $[110]$  and  $[1-10]$  directions.

Nan-Hsin Yu  
Department of Physics, Baylor University

Date submitted: 30 Dec 2010

Electronic form version 1.4