

Abstract Submitted  
for the MAR11 Meeting of  
The American Physical Society

**Endotaxial Si nanolines in Si(001):H<sup>1</sup>** JAMES OWEN, FRANÇOIS BIANCO, SIGRUN A. KÖSTER, DANIEL MAZUR, CHRISTOPH RENNER, University of Geneva, DAVID BOWLER, University College London and London Centre for Nanotechnology — The study of one dimensional wires is of great interest in the area of low-dimensional physics, and these structures also have potential applications in future nanodevices. A perfectly straight nanoline embedded in a H-terminated silicon surface has been fabricated by a process of hydrogenation of a Bi nanoline surface using an atomic H beam source, and comprises a triangular core of Si embedded in the top five layers of the Si substrate. The defect density of this nanoline is extremely low, and being H-terminated, it is stable in air for limited periods of time. Scanning Tunnelling Microscopy experimental data and Density Functional Theory calculations have been used to determine the atomic structure of this nanoline, so-called the Haiku Stripe, and have revealed that there exists a 1D state localised to the nanoline core, lying just above the conduction band minimum.

<sup>1</sup>This work is supported by the Swiss National Science Foundation.

James Owen

Date submitted: 18 Nov 2010

Electronic form version 1.4