Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

From aperiodic nanolines to imperfect $\sqrt{3} \times \sqrt{3}$: a survey of bismuth overlayer structures on Si(001) and Si(111) JENNIFER MACLEOD, ALASTAIR MCLEAN, Department of Physics, Queen's University, Kingston, Ontario, Canada — Bismuth overlayers on silicon surfaces are of considerable interest because of their surfactant properties in epitaxial germanium growth. Careful control of bismuth deposition parameters can result in a number of different surface structures, from the irregularly spaced, one-dimensional bismuth line system on Si(001) to the different phases of the $\sqrt{3}\times\sqrt{3}$-R30° reconstruction on the Si(111) surface. The leitmotiv underlying all of these overlayer systems is the strain generated by the mismatch between the covalent radii of bismuth and silicon; manifestations of this will be illustrated through scanning tunneling microscope (STM) images. We will explore the evolution from the 2×n reconstruction on (001) to the bismuth line surface, and illustrate the large-scale domain structure of the line system. A new type of defect structure on the bismuth-covered Si(111) surface will be described and examined in the context of surface strain.

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Date submitted: 22 Jan 2005 Electronic form version 1.4