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The Pb corrugation on Si(111) Pb $\alpha-\sqrt{3}$x$\sqrt{3}$ as a probe of the island crystallography[1] MICHAEL YAKES, MYRON HUPALO, JIZHOU CHEN, MICHAEL TRINGIDES, Ames Laboratory-Iowa State University — Although the corrugation on top of the uniform height Pb islands has been studied by STS, quantitative information about the island morphology is still missing. With this complementary study based on SPA-LEED and STM we use the dependence of the corrugation on coverage to deduce the detailed island crystallographic structure. The two types of bilayer islands which have been identified from their opposing contrasts in STM are analyzed with diffraction and extended STM images to deduce their relative population. Islands with one type of FCC faulted stacking (i.e. ACB) are replaced with coverage by the islands with opposite stacking (i.e. ABC). Since the island shapes are triangular (due to inequivalent type of A- and B- steps) the population reversal is also confirmed from changes in the island orientation with coverage. In addition, a change in the rotation of the Pb overlayer relative to the Si substrate (measured from the location of the Pb(10)) is used to explain the changing intensity "hexagon-like" to "star-like" distribution of the SPA-LEED pattern near the (00) spot. This rotation explains quantitatively the changing corrugation period. As the coverage increases the preferred Pb orientation changes from 0^o to 5.6^o rotated with respect to the [110] substrate direction.

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Michael Yakes
Ames Laboratory-Iowa State University

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