

Abstract Submitted
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Fluctuations of Pb/Si(111) Domain Boundaries¹ WILLIAM CULLEN, Department of Physics and MRSEC, University of Maryland, DANIEL DOUGHERTY², Department of Chemistry, University of Pittsburgh, MASA ISHIGAMI, Department of Physics and MRSEC, University of Maryland, ELLEN WILLIAMS, Department of Physics and MRSEC, University of Maryland — We have used variable-temperature scanning tunneling microscopy to study fluctuations of a 1D interface — the boundary between two coexisting surface phases. We have prepared Pb/Si(111) surfaces that consist of high-density (1×1) -Pb domains coexisting with a lower-density $\sqrt{3} \times \sqrt{3} - R30^\circ$ -Pb phase. The domain boundaries between these phases fluctuate at moderate temperatures, allowing direct observation with STM. Measurement of the temporal correlation function for the fluctuating boundary between 525 K and 625 K allows determination of the mass transport mechanisms below and above the onset of thermal desorption of the (1×1) phase. In the desorption regime, our measured dynamical exponent of $1/2$ provides microscopic confirmation that fluctuations of the (1×1) boundaries occur via exchange of mass with a 2D adatom gas on the $\sqrt{3} \times \sqrt{3}$ phase, consistent with the zeroth-order desorption kinetics inferred from macroscopic measurements.

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²Present Address

William Cullen
Department of Physics and MRSEC, University of Maryland

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