

Abstract Submitted  
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**Real-Time Microscopy of Second Order Phase Transitions on Pb/Ge(111)** S. CHIANG, Y. SATO, University of California Davis — Using the Low Energy Electron Microscope (LEEM), we have studied phase transitions on the Pb/Ge(111) surface. The critical temperature of the phase transition from  $\beta$  to (1x1) depends strongly on the coverage, occurring at 180C for coverage below 1ML and at 270C for coverages above 1.33ML. LEEM data clearly show this difference in the critical temperature derives from the different mechanisms of the transformation. For coverages between 0.33ML and 1ML, where the  $\alpha - (\sqrt{3} \times \sqrt{3})R30^\circ$  phase coexists with the  $\beta - (\sqrt{3} \times \sqrt{3})R30^\circ$  phase below the critical temperature and with the (1x1) phase above it, the reversible phase transformation from  $\beta$  to (1x1) shows typical second order phase transition behavior, i.e., the intensity of the  $\beta$  phase gradually changes with temperature. For coverages above 1 ML, where the surface is either the low temperature  $\beta$  phase or the higher temperature (1x1) phase, the system shows an unusual reversible second order phase transition, with fluctuating domains. The frequency analysis of the critical fluctuations will be presented, and the different mechanisms for both of the second order phase transitions mentioned above will be discussed.

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