Abstract Submitted
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Evidence for Collective Motion in LEEM Measurements of Metals on Semiconductors[1] SHIRLEY CHIANG, YU SATO[2], JASON GIACOMO[3], CORY MULLET, MARSHALL VAN ZIJLL, BRET STENGER, DYLAN LOVINGER[4], University of California Davis — We review evidence for collective motion from LEEM measurements of three metal on semiconductor systems: Pb/Ge(111), Au/Ge(111), and Ag/Ge(110). Pb/Ge(111) shows a novel phase separation with fluctuating domains of $\sim$ 100nm size which spontaneously switch back and forth from the (1x1) to β phase in the region of the phase diagram where the two phases coexist. This striking mechanism occurs because nm-scale domains can have thermally-induced density fluctuations comparable to the density difference between the two phases (PRL, 99, 096103 (2007)). Au/Ge(111) also shows evidence for fluctuating domains between the ($\sqrt{3}$x$\sqrt{3}$)R30 and (1x1) phases, both for small domains of 100nm diameter, and at the edges of large domains on a sample with low step density. LEEM movies also show "hopping" of large islands (tens to hundreds of nm in diameter) of Au on Ge(111). Self-assembly of large one dimensional (1D) islands (1-10 μm x 70-140 nm, $\sim$ 7nm high, for 7ML) along the [1,-1,0] direction occurs for Ag grown from 300-530 °C on Ge(110). During the growth process, such 1D islands have been observed to collapse into other islands and defects in $<$ 1sec.

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