Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Restructuring Due to Quantum Size Effects During Annealing in Ultrathin Films of Ag/Si(111)[1] K.R. KIMBERLIN, D.C. LUDOIS, S.M. BINZ, K.R. ROOS, J. LOZANO, P.W. WANG, J.H. CRAIG, JR. , Bradley University — Ultrathin films of silver have been epitaxially grown *in situ* at low temperature and studied with scanning tunneling microscopy (STM) and reflection high energy electron diffraction (RHEED). Restructuring occurs during annealing to 300 K producing flat-topped islands two atomic layers in height in accordance with previous work.[2] Further annealing produces a diverse distribution of heights and sizes of flat topped, vertical-sided islands. At higher coverage, a smooth films anneal to dentritic structures of a single height. A RHEED transmission pattern is formed after annealing the films and crystal orientation is determined. Finally, annealing above 550K produces typical 3D island "wedding cake" structures atop the $\sqrt{3} \times \sqrt{3}$ wetting layer on Si(111). These results will be discussed in an "electronic growth" model where Quantum Size Effects are thought to stabilize particular island heights, producing this unusual flat island growth.

[1]This work is supported by NSF grants 0203097, 0215899, 0511811, and selected grants from Bradley Univ.
[2]Gavioli, et. al., *Phys. Rev. Lett.,* **82**(1) 1999, p. 129-132.

Kevin Kimberlin
Bradley University

Date submitted: 03 Dec 2005 Electronic form version 1.4