

Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Resistance Noise and Morphology in Percolating Films of Ag on Si(111)¹ DANIEL DOUGHERTY, WILLIAM CULLEN, ELLEN WILLIAMS, Dept. of Physics University of Maryland at College Park — Structure, conductance and noise in submonolayer Ag films on Si(111)-(7x7) near the onset of electrical conduction have been measured in situ in a UHV growth chamber. Noise measurements characteristic of the film morphology can be accomplished only when transport through the substrate is prevented. In this case, extremely low doping ($\sim 10^{13} \text{ cm}^{-3}$) and low temperature measurements were used to accomplish this. Measurement of the exponent of the variation of the noise level with Ag coverage near the percolation threshold yields a value of 1.06 ± 0.09 , inconsistent with lattice percolation at the interface with the Si substrate. The inverted random void model is consistent with this result, yielding the possibility that a broad distribution of degree overlap of adjacent Ag clusters is the origin of the noise. This model will be discussed in context of the detailed observations of film morphology near the percolation threshold using low-temperature STM and simultaneous conductivity measurements. Implications for the role of the Si substrate in electrical transport are also discussed.

¹Supported by the NSF-NIRT and NSF-MRSEC programs.

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Date submitted: 06 Dec 2004

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