Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Measurement and modeling of temperature-dependent step bunching on Si(111) BRIAN GIBBONS, JONATHAN PELZ, The Ohio State University — Direct Current (DC) induced step bunching on Si(111) is a long-standing puzzle, with the required DC direction for bunching (relative to the "step-down" vicinal surface direction) reversing multiple times with increasing temperature. It was recently proposed [1,2] that this could be explained if step attachment is *faster (slower)* than terrace diffusion in Temperature Regime II (Regimes I and III). We have numerically simulated a similar model and directly compared with measurements of how the step bunching depends on the initial terrace width l_0 in all three regimes [3]. Using realistic parameter values for terrace diffusion and step attachment, this model can account for the bunching behavior in all three temperature regimes, provided there indeed exist modest (0.2 – 0.4 eV) temperature-dependent variations in the relative activation barriers for attachment and diffusion, and/or modest changes in the respective activation attempt rates. Work supported by NSF. [1] N. Suga *et al.*, *Jpn. J. Appl. Phys.* **39**, 4412 (2000). [2] T. Zhao *et al.*, *Phy. Rev. B* **71**, 155326 (2005). [3] B.J. Gibbons *et al.*, submitted to Surf. Sci; Surf. Sci. Lett. **575**, L51-56 (2005).

Brian Gibbons
The Ohio State University

Date submitted: 05 Dec 2005 Electronic form version 1.4