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Dependence of direct-current-induced Si(111) Step Bunching on Initial Surface Miscut: Experiments and Simulations BRIAN GIBBONS, The Ohio State University, SYLVIA SCHAEPE, JONATHAN PELZ — DC heating of Si(111) surfaces can produce step bunching, with a complicated dependence on current direction and temperature. We have measured how the average step bunch height H_B and maximum bunch slope m_B depend on initial surface miscut θ_0 for 940 $^\circ$C$< T <$1090 $^\circ$C [1] in order to evaluate possible parameter values for the conventional "sharp-step" model, and for a recently-proposed "2-region" (2R) model [2]. From 1D numerical simulations using realistic parameters for Si(111), we find that the sharp-step model can reproduce the observed scaling of H_B and m_B with θ_0 only if the ratio (Diffusion/attachment rate)$\equiv D_t/\kappa \sim$2-50 nm, indicating largely "diffusion limited" adatom flow onto steps. With the 2R model (with an added step attachment barrier), bunching with "step-up" adatom flow can occur if the sticking probability is large ($>\sim$20%), and can match the observed scaling with θ_0 provided the adatom effective charge is also large ($0.2e$ – $1e$). *Work supported by NSF Grant DMR-0074416.* [1] Gibbons *et al.*, Surf. Sci. Lett. *in press.* [2] Zhao *et al.*, Phys. Rev. B **70**, 161303 (2004).

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