1096-35-1086 **Dionisios Margetis*** (dio@math.umd.edu), 2106 Mathematics Building, Department of Mathematics, University of Maryland, College Park, MD 20742, and **Kanna Nakamura** (nakamura@math.umd.edu), 4400 Mathematics Building, Department of Mathematics, University of Maryland, College Park, MD 20742. *Homogenization of composite vicinal surfaces in 1+1 dimensions.*

We formally apply classical homogenization to derive macroscopic relaxation laws for crystal surfaces with distinct inhomogeneities at the microscale. The proposed method relies on a multiscale expansion in one spatial coordinate. The starting point is the Burton-Cabrera-Frank (BCF) model for the motion of line defects (steps) separating nanoscale terraces. We enrich this model with sequences of distinct material parameters, i.e., disparate diffusivities of adsorbed atoms (adatoms) across terraces, kinetic sticking rates at step edges, and step energy parameters for elastic-dipole interactions. Multiscale expansions for the adatom concentration and flux are used, with a slow diffusive time scale consistent with the quasi-steady regime for terrace diffusion. The ensuing macroscopic, nonlinear evolution laws incorporate averages of the microscale parameters. (Received September 12, 2013)