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The Relaxation of Vicinal (001) with ZigZag [110] Steps[1] MICAH HAWKINS, Department of Physics, University of Maryland, College Park, AJMI BH HAMOUDA, Faculte des Sciences de Monastir, Monastir, Tunisia, DIEGO LUIS GONZÁLEZ-CABRERA, THEODORE L. EINSTEIN, Department of Physics, University of Maryland, College Park — This talk presents a kinetic Monte Carlo study of the relaxation dynamics of [110] steps on a vicinal (001) simple cubic surface. This system is interesting because [110] steps have different elementary excitation energetics and favor step diffusion more than close-packed [100] steps. In this talk we show how this leads to relaxation dynamics showing greater fluctuations on a shorter time scale for [110] steps as well as 2-bond breaking processes being rate determining in contrast to 3-bond breaking processes for [100] steps. The existence of a steady state is shown via the convergence of terrace width distributions at times much longer than the relaxation time. In this time regime excellent fits to the modified generalized Wigner distribution (as well as to the Berry-Robnik model when steps can overlap) were obtained. Also, step-position correlation function data show diffusion-limited increase for small distances along the step as well as greater average step displacement for zigzag steps compared to straight steps for somewhat longer distances along the step. Work supported by NSF-MRSEC Grant DMR 05-20471 as well as a DOE-CMCSN Grant.

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