

Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Changing growth conditions during surface growth¹ YEN-LIANG CHOU, MICHEL PLEIMLING, R. K. P. ZIA, Virginia Polytechnic Institute and State University — Motivated by a series of experiments that revealed a temperature dependence of the dynamic scaling regime of growing surfaces, we investigate theoretically how a nonequilibrium growth process reacts to a sudden change of system parameters. We discuss quenches between correlated regimes through exact expressions derived from the stochastic Edwards-Wilkinson equation with a variable diffusion constant. Our study reveals that a sudden change of the diffusion constant leads to remarkable changes in the surface roughness. Different dynamic regimes, characterized by a power-law or by an exponential relaxation, are identified, and a dynamic phase diagram is constructed. We conclude that growth processes provide one of the rare instances where quenches between correlated regimes yield a power-law relaxation.

¹Supported in part by NSF-DMR-0705152 and NSF-DMR-0904999

Michel Pleimling
Virginia Polytechnic Institute and State University

Date submitted: 19 Nov 2009

Electronic form version 1.4