

Abstract Submitted  
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**Multiscale Theory of Fluctuating Interfaces: From Self-Affine to Unstable Growth**<sup>1</sup> CHRISTOPH HASELWANDTER, Imperial College, London, DIMITRI VVEDENSKY, Imperial College, London — We describe a framework for the multiscale analysis of atomistic surface processes which we apply to the Wolf-Villain model for epitaxial growth. Coarse-graining is accomplished by calculating the renormalization-group trajectories from initial conditions determined by the regularized atomistic theory. All of the intermediate scaling regimes known from computer simulations are obtained, but we also find that the asymptotic behavior of two-dimensional substrates is determined by a hitherto unknown fixed point. This provides an explanation of recent experiments on Ge(001) with the intriguing conclusion that the relaxation mechanism responsible for ordered structures early in the growth process produces an instability at longer times that leads to epitaxial breakdown.

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