## Transients due to instabilities hinder Kardar-Parisi-Zhang scaling: A unified derivation for surface growth by electrochemical and chemical vapor deposition

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Abstract-

We propose a unified moving boundary problem for surface growth by electrochemical and chemical vapor deposition, which is derived from constitutive equations into which stochastic forces are incorporated. We compute the coefficients in the interface equation of motion as functions of phenomenological parameters. The equation features the Kardar-Parisi-Zhang (KPZ) nonlinearity and instabilities which, depending on surface kinetics, can hinder the asymptotic KPZ scaling. Our results account for the universality and the experimental scarcity of KPZ scaling in the growth processes considered.

Index Terms- diffusion-limited aggregation, vicinal surfaces, dynamics, model, electrodeposition, fluctuations, equilibrium, interfaces, solidification, imbibition

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