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# Anomalous scaling in a nonlocal growth model in the Kardar-Parisi-Zhang universality class

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**Abstract-**

**We study the interface dynamics of a discrete model previously shown [A. Sanchez, M. J. Bernal, and J. M. Riveiro, Phys. Rev. E 50, R2427 (1994)] to quantitatively describe electrochemical deposition experiments. The model allows for a finite density of biased random walkers which irreversibly stick onto a substrate. There is no surface diffusion. Extensive numerical simulations indicate that the interface dynamics is unstable at early times, but asymptotically displays the scaling of the Kardar-Parisi-Zhang universality class. During the time interval in which the surface is unstable, its power spectrum is anomalous; hence, the behaviors at length scales smaller than or comparable with the system size are described by different roughness exponents. These results are expected to apply to a wide range of electrochemical deposition experiments.**

**Index Terms- electrochemical deposition, dendritic growth, columnar growth, surface growth, interfaces, erosion, alloys**



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