

Meeting: 1003, Atlanta, Georgia, SS 28A, AMS-SIAM Special Session on Reaction Diffusion Equations and Applications, I

1003-35-1656 **Cameron R. Connell*** (connell@njit.edu), Department of Mathematical Sciences, New Jersey Institute of, Newark, NJ 08540. *Reaction-Diffusion models for epitaxial growth: scaling laws in step flow.*

We present models of step flow growth based on reaction-diffusion equations. A particular focus is models that incorporate both step bunching and step bending instabilities, induced by impurities, electromigration, faceting, and other generic phenomena. The sharp interface limit and travelling wave solutions of the reaction-diffusion system allow the complicated patterns that form to be understood in terms of the formation of equilibrium states and the travelling waves that connect them. Reduced models for the evolution, based on the travelling wave solutions, may then be formulated. These reduced models provide a quantitative understanding of the large scale long time behaviour of the models. In particular, they provide a basis for predicting and calculating scaling exponents for the coarsening processes that are observed in epitaxial growth. (Received October 06, 2004)