

Analysis of Epitaxial Growth and Dislocation Models at Different Scales

Yang Xiang

Department of Mathematics, Hong Kong University of Science and Technology, Hong Kong

Email: maxiang@ust.hk

We present some analysis results on the properties of defects in crystals using discrete and continuum models. We analyze the step bunching properties on epitaxial surfaces under elastic interactions, including the energy scaling law, the appearance of the bunch structure, and sharp bounds for bunch size. We also prove the convergence from the atomistic model to the Peierls-Nabarro model (a continuum model) for dislocations in crystals.