

Abstract Submitted
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Phase-Field Simulations of Morphological Development During Heteroepitaxy KATSUYO THORNTON, University of Michigan, STEVEN WISE, University of California, Irvine, NIRAND PISUTHA-ARNOND, Northwestern University, JOHN LOWENGRUB, University of California, Irvine, P.W. VOORHEES, Northwestern University — In heteroepitaxial growth, a lattice mismatch between the substrate and the film materials drives morphological instabilities, resulting in surface roughening and dot or island formation on the surface. Controlling the patterns formed by these instabilities at the nanoscale is of technological importance since uniform dot size and spatial distribution are needed to provide highly desired electronic and optical characteristics. Large-scale three-dimensional simulations have recently become possible using a multigrid code. With this model, we explore options for directed self-assembly of quantum dots. In particular, we will discuss patterning of the substrate surface, patterning of the film surface and subsequent annealing, and multistep deposition.

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