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**Continuum Elasticity Modeling and Nonlinear Effects during Epitaxially Strained Island Evolution**[1] CHAMPIKA GIGIRIWALA GAMAGE, ZHI-FENG HUANG, Department of Physics and Astronomy, Wayne State University — The formation of surface nanostructures such as islands or quantum dots during strained film epitaxy has attracted continuing great interest. One of the underlying mechanisms has been attributed to the occurrence of morphological instability of the strained film, for which the coupling between film/substrate misfit strains, film deposition rate and growth temperature plays a major role. In this research we focus on the nonlinear evolution of strained surface nanostructures during epitaxy, via constructing a continuum elasticity model based on the 2nd order perturbation theory. The resulting nonlinear evolution equation for film morphology, which also incorporates some realistic factors such as wetting effects, yields a long-wavelength, dynamic description of surface islands or quantum dots. The morphological properties of the growing film and the self-organization process of the coherent surface islands are examined, with the dependence on various material parameters and growth conditions identified.

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