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Phase Field Crystal Modeling of Island Formation and Dislocation Nucleation During Strained Film Growth ZHI-FENG HUANG, Dept. of Physics and Astronomy, Wayne State University, KEN ELDER, Dept. of Physics, Oakland University — We study the process of nanostructure self assembly during epitaxial growth of strained solid films through the use of the phase field crystal model. The model is derived from density functional theory and incorporates anisotropy, elasticity and plastic deformations on atomic length and diffusive time scales. We particularly address the formation and evolution of islands/mounds in strained thin films following an initial morphological instability and the nucleation and climb of misfit dislocations. The relation between film structural properties and materials and growth conditions are also discussed.

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