EVOLUTION AND REGULARITY RESULTS FOR EPITAXIALLY STRAINED THIN FILMS AND MATERIAL VOIDS

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ABSTRACT. We consider free boundary problems that model the evolution of interfaces in the presence of elasticity, such as thin film profiles and material void boundaries. These problems are characterized by the competition between the elastic bulk energy which tends to destabilize the interface, and the surface energy, which has a stabilizing effect.

First, we introduce the evolution equation with curvature regularization that models the motion of a two-dimensional thin film by evaporation-condensation on a rigid substrate. The results presented are contained in [3] where the author establishes short time existence, uniqueness and regularity of the solution using De Giorgi's minimizing movements to exploit the L^2-gradient flow structure of the equation.

Second, we consider the relaxed energy introduced in [2] that depends on admissible pairs (E, u) of sets E and functions u defined only outside of E. For dimension three, this energy appears in the study of material voids in solids. In [1] regularity results in dimension $d \geq 2$ for minimal configurations are established without using any artificial assumption of starshapedness of the voids.

REFERENCES

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