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OKINAWA INSTITUTE OF SCIENCE AND TECHNOLOGY
沖縄科学技術大学院大学

THEORETICAL SCIENCES VISITING PROGRAM

TSVVP TALK

Analytical Validation of Variational Models for Epitaxially Strained Thin Films: A Review

2023
THU.

August 10

15:00–16:00

HYBRID L4E48, ZOOM



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Films self-assembled by epitaxial growth on substrates are nowadays employed in an ever-growing number of applications ranging from semiconductor devices to solar cells. Predetermining the film morphology and the surface instabilities is crucial for controlling the film properties. However, the classical characterization of crystals as solutions of isoperimetric problems accounting for the film anisotropy and the substrate wettability, is inaccurate, as the mismatch between the film and the substrate optimal lattice at their free-standing equilibrium may generate large stresses. A delicate compromise between the surface and the elastic energy must then be reached. By considering both free boundary problems and atomistic models an overview of the mathematical results on the analytical validation of literature models and on their microscopical justification will be presented.



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Paolo Piovano

Paolo Piovano is a Tenure Track Assistant Professor at the Polytechnic University of Milan whose research is devoted to the mathematical modeling of phenomena with applications to materials science and more recently, bioengineering. The focus is on the characterization of the optimal shapes and instabilities of crystalline and biological interfaces by means of variational methods in the framework of continuum and molecular mechanics. He received his PhD at Carnegie Mellon University, USA, and after a Post Doc at the Italian National Research Council, he was University Assistant and then Project Group Leader at the University of Vienna, where he is currently Senior Researcher. He is also Secretary and Treasurer of the “International Society for the Interaction of Mechanics and Mathematics” (ISIMM).

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