Graduate Seminar

Speaker

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Thursday, March 8, 2018
1pm, HH-3017

Finite-Element Modeling of Liquid Crystal Equilibria

Abstract:

Numerical simulation tools for fluid and solid mechanics are often based on the discretisation of coupled systems of partial differential equations, which can easily be identified in terms of physical conservation laws. In contrast, equilibrium configurations of many liquid crystal phases are more naturally described by the first-order optimality conditions of a constrained free-energy functional. In this talk, I will present a variational finite-element approach for computing liquid crystal equilibria, comparing penalty and Lagrange multiplier approaches for enforcing the needed constraint. Fast solvers for the resulting linearized systems will be discussed, as well as a modified nonlinear iteration to identify multiple equilibrium states concurrently.