

## Multiscale variational analysis of dislocations

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The main mechanism for crystal plasticity is the formation and motion of a special class of defects, the dislocations. These are topological defects in the crystalline structure that can be identified with lines on which energy concentrates. In recent years there has been a considerable effort for the mathematical derivation of models that describe these objects at different scales (from an energetic and a dynamical point of view). The description of the problem is extremely complex in its generality. The lecture will be devoted to present some variational models for dislocations that can be obtained, by Gamma-convergence, starting from discrete or semi-discrete energies.

I will discuss the relation between these models and other classical models in applied mathematics (as Ginzburg-Landau models for vortices or non-local Cahn-Hilliard energies for phase transitions).