

Variational modeling of dislocation structures in crystals

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Dislocations are topological singularities of the strain field, which play a crucial role in the plastic deformation of crystals. Their energy can be understood on the basis of linear elasticity theory. The transition from the quadratic elasticity functional to a line-tension model is, however, not straightforward and leads to relaxation and formation of microstructures, in the form of oscillations in the dislocation pattern. In this talk I shall discuss recent analytical progress in the variational analysis of dislocations.