

The Emergence of Cosserat-type Structures in Metal Plasticity

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Abstract

We study an energy functional able to describe low energy configurations of a two dimensional lattice with dislocations in a nonlinear elasticity regime. The main result can be described as follows: configurations of energy comparable to the lattice spacing consist of piecewise constant microrotations with small angle grain boundaries between them. Moreover, we also give bounds to the energy of particular configurations describing a small angle symmetric tilt grain boundary.