

Quantitative stochastic homogenization of problems in fracture mechanics

Prof. Dr. Julian Fischer (ISTA Klosterneuburg)

The quantitative homogenization of nonlinear random materials is by now rather well-understood in the case of uniformly convex energies. On the other hand, in the case of nonconvex problems - such as Griffith-type models in fracture mechanics - the theory is still in its infancy. In Griffith-type models for fracture, the formula for the homogenized fracture energy leads to a problem of finding surfaces of minimal energy in a random environment. We establish an algebraic rate of convergence (with respect to the length of correlations in the medium) for the energy of such minimizing surfaces in the case of reflection-invariant distributions. We then discuss possible implications concerning a quantitative homogenization theory for Mumford-Shah-like functionals with random coefficients.

joint work with Antonio Agresti and Nicolas Clozeau