Regularity results for a static relaxed micromorphic model

Prof. Dr. Dorothee Knees (Universität Kassel)

The relaxed micromorphic model is a generalized continuum model allowing to describe for instance size effects of microstructured solids. The state of the solid subject to external loads is characterized by the displacement field $u : \mathbb{R}^3 \supset \Omega \to \mathbb{R}^3$ and the microdistortion tensor $P : \Omega \to \mathbb{R}^{3\times 3}$. The corresponding system of partial differential equations consists of the system of linear elasticity that is coupled with a system of Maxwell type for the distortion tensor P. We will discuss the regularity of weak solutions under different assumptions on the smoothness of the domain. The main ingredients for the proofs are the Helmholtz decomposition and refined difference quotient arguments based on generalized inner variations in combination with a Piola-type transformation. This is ongoing joint work with Patrizio Neff (Duisburg-Essen) and Sebastian Owczarek (Warsaw).