Homogenization in BV of a model for layered composites in finite crystal plasticity

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In this talk, we will study the effective behavior of a two-dimensional variational model within finite crystal plasticity for high-contrast bilayered composites. Precisely, we will consider materials arranged into periodically alternating thin horizontal strips of an elastically rigid component and a softer one with one active slip system. The energies arising from these modeling assumptions are of integral form, featuring linear growth and non-convex differential constraints. We will approach this non-standard homogenization problem via Gamma-convergence. A crucial first step in the asymptotic analysis will be the characterization of rigidity properties of limits of admissible deformations in the space BV of functions of bounded variation. In particular, we will prove that, under suitable assumptions, the two-dimensional body may split horizontally into finitely many pieces, each of which undergoes shear deformation and global rotation. This will allows us to identify a potential candidate for the homogenized limit energy, which we will show to be a lower bound for the Gamma-limit. In the framework of non-simple materials, we will present a complete Gamma-convergence result, including an explicit homogenization formula, for a regularized model with an anisotropic penalization in layer direction. This is joint work with Rita Ferreira (Kaust) and Carolin Kreisbeck (Utrecht).