MS2: Regularized Failure Models

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Physically sound and mathematically well-posed description of the complete process of mechanical failure must properly account for the energy dissipated by the loss of material integrity. Fracture models deal with fully localized failure patterns and attribute the dissipated energy to crack surfaces, considered as displacement discontinuities. On the other hand, continuum damage models as well as plasticity models retain continuity of the displacement field and describe the failure processes by stress-strain laws with softening, which lead to a certain dissipation density per unit volume. Objectivity of such an approach is preserved only if the width of localized damage or plastic zones is controlled by an appropriate regularization technique that acts as a localization limiter and prevents localization into zones of zero volume. The purpose of this minisymposium is to stimulate an exchange of ideas among researchers working on various types of regularization methods and non-conventional fracture models including, among others, the following approaches:

- Regularizations and approximations of crack discontinuities
- Phase-field approaches to brittle and ductile fracture
- Variational approaches to fracture
- Thick level set approaches to fracture
- Nonlocal models with variable length scale
- Regularized kill-element type approaches
- Scale bridging techniques and homogenization methods
- Diffusive fracture approaches in complex multifield environments

Special attention shall be devoted to techniques that combine continuous and discontinuous models and provide a realistic description of the entire failure process from the initial diffuse stage to fully localized rupture.