

## Mechanics at the nano-scale

*Mechanics at the nano-scale: In situ measurements and simulation under extreme conditions*

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Recent experimental developments in the field of the mechanics at the micro- or nano-scale now enable *in situ* and *operando* studies of elementary deformation mechanisms (plasticity, phase change...) under real-life conditions, including "extreme" experimental conditions (high/low temperatures, high-pressure, irradiation, high deformation rates, etc.) or through a combinatorial approach relying on multiple experimental techniques (electrical measurements, electron microscopy, X-ray diffraction, etc.). Concurrently, the recent improvements of numerical simulations (molecular dynamics, discrete dislocation dynamics, etc.) enable the simulation of systems closer to the experimental scale. **This mini-symposium will focus on recent studies and developments which have shown to expand our knowledge on the mechanical behaviour of complex specimens (e.g., nano-objects, thin films and bulk nanostructured materials) under complex loading conditions (including cyclic fatigue, fracture testing,...) or under extreme deformation conditions (temperature, high-pressure, high-strain rate, irradiation, etc.).** The symposium highly welcomes contributions from researchers in the experimental or numerical fields, suited to gain a deep insight into the mechanisms responsible for small scale effects. Direct applications of these characterization methods applied to solve complex engineering issues are also welcomed.

