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Séminaire du LMS

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Salle Jean Mandel

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Small-scale plasticity mechanisms in crystalline and amorphous materials revealed by advanced in-situ TEM nanomechanical testing

Recently, the development of a new generation of advanced instruments for in-situ TEM nanomechanical testing has allowed establishing a one-to-one relationship between load-displacement characteristics and stress-induced microstructure evolution in the transmission electron microscope. In the present work, it will be demonstrated that a step forward in the investigation of the small-scale plasticity mechanisms in crystalline and amorphous materials can be made by combining commercial and in-house developed lab-on-chip micro/nanomechanical testing techniques with advanced TEM techniques including high resolution aberration corrected (S)TEM and spectroscopy, Angstrom-beam-electron-diffraction as well as automated crystallographic orientation, phase and nanostrain mapping in TEM. These techniques have been used to reveal the fundamental plasticity mechanisms activated in freestanding nanocrystalline and metallic glass thin films and, more recently, magnesium iron silicates.