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IDENTIFICATION OF HETEROGENEOUS MATERIAL PROPERTIES

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ABSTRACT

Any material at a given scale has a structure that makes the material heterogeneous. This heterogeneity can be an asset with regard to a desired performance (durability, permeability, fatigue, etc.) provided that the understanding of the induced mechanisms is well mastered. In an economic context where the need for lighter structures or the use of multi-functional materials is becoming a priority, understanding and quantifying the mechanisms of material deformation at the scale of heterogeneities are challenges.
Today's locks are mainly related to the scales involved, the multi-axial stresses of the material and the modelling of these heterogeneities.
Thus, experimental, observational and simulation skills must interact. This need for enhanced dialogue is largely due to the desire to get to know more precisely increasingly complicated materials that are subject to multi-scale and high-gradient stresses. It is therefore essential to understand heterogeneity through simulation. To do this, it will be necessary to be able to discriminate phases via texture analysis methods, to propose models in an acceptable time, to dimension the tests and their protocols, to set up measures to identify the relevant parameters of the models and to evaluate the gap with the experimental reality.
The objective of this symposium is to bring together researchers working on state-of-the-art computational techniques, on the mechanical simulation and the development of digital imaging techniques on the heterogeneous material to exchange ideas, present novel developments and discuss recent advances. Topics of interest include, but are not limited to:

- Mathematical methods for realistic reconstruction of material microstructure
- Inverse identification of the mechanical properties
- Construction of a constitutive law
- Optimization algorithm
- Digital image correlation technique for heterogeous material
- Non-linear behavior