

COMPUTATIONAL MODELLING AND OPTIMIZATION OF ADVANCED MATERIALS AND STRUCTURES

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ABSTRACT

The inherent complexity associated with advanced materials (e.g., composites, metamaterials, etc.) usually requires the use and development of new advanced computational techniques to model and simulate their behaviour, and to optimize their design for specific applications. These techniques include structural simulations combined with multiscale, homogenization, optimization and machine learning methods, addressing challenges like model order reduction for complex systems.

This thematic session aims to discuss topics related with advanced materials for any kind of application, focusing on challenges and innovations in modelling, simulation or design of such materials. Discussions may extend beyond computational aspects to explore applications, or manufacturing challenges.

The following topics fall within the scope of the thematic session:

- Multiscale modelling of materials.
- Model order reduction techniques.
- Size and/or topology optimization.
- Use of AI/machine learning tools for the design and analysis of materials.
- Modelling and design of composite materials for different applications.
- Characterization and design of functional materials and metamaterials.