

Multiscale modelling of Additive Manufacturing

IMWF, University of Stuttgart



Institute for Materials Testing, Materials
Science and Strength of Materials

Project idea: Multiscale modeling of Additive Manufacturing

Call area: No. 9



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Project Description

Additive manufacturing (AM) enables the production of complex lightweight structures that could not be generated with conventional processes. The performance of these structures depends both on the micro- and macro-mechanical behavior of the material itself, which is highly affected by the **manufacturing process**, as well as on the **lightweight design** of the components. Thus, a hybrid multiscale modeling **design optimization** approach is proposed to generate these efficient lightweight components for industrial applications and to provide optimization strategies, finally.

Project Objectives

- Structure-property-design-performance relations of **printed lightweight materials**
- Creating a **digital twin** of the process and the component
- Coupling of **AM manufacturing** route with component **performance** route
- Creating an **interface** between optimization process and customer

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Our know-how...

- Multi-scale modeling
- High-performance computing
- Process simulations
- Design optimization

We are looking for...

- Material supplier
- Testing facilities
- Industry for role models

