

MODELING AND SIMULATION FOR METAL ADDITIVE MANUFACTURING

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ABSTRACT

In pursuit of more design freedom, rapid prototyping and less wasteful manufacturing techniques, Additive Manufacturing (AM) gets more into focus by industry. Especially the aerospace sector, where weight and stiffness are crucial, AM promises huge benefits.

While traditional subtractive manufacturing techniques are already well understood, the effects of AM's heating cycles and the layer by layer production are not. Furthermore, these processes influence the material and the print quality from the micro scale to the whole part. This is especially challenging for numerical models, since a variety of space and time discretizations need to be considered. [1]

This session will set a focus on the modelling and simulation of these metal AM processes and how to efficiently include all relevant physical effects into it. The objective is to discuss and propose solutions to challenges regarding the material modelling, thermomechanical modelling and on how to approximate these models numerically efficient.

To keep the development and research as close to the actual user and industry requirements as possible, this session is also open for AM printer manufacturers and power users. This should pave the way towards a fast adaption and industry applicable AM simulations.

REFERENCES

- [1] S. S. Babu, L. Love, R. Dehoff, W. Peter, T. R. Watkins und S. Pannala, „Additive manufacturing of materials: Opportunities and challenges,“ *MRS Bulletin*, Bd. 40, p. 1154–1161, 2015.