Bachelor’s or Master’s thesis

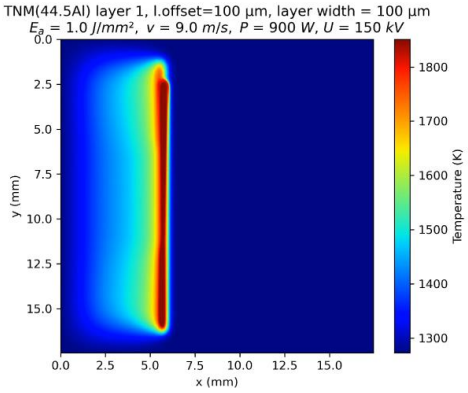
Thema: **Process optimization by multiscale thermal simulations**

Start: Any time from now on

Description: Selective electron beam melting (PBF-EB) is a powder bed-based additive manufacturing process. In this process, defined areas of the powder are melted layer by layer to produce components.

For complex geometries, the thermal conditions vary during the process. Different heat diffusivities for solid and powder material are one reason for the complex thermal fields. Furthermore, heat accumulation can lead to elevated temperatures in higher layers, resulting in unstable melting conditions. To be able to predict and mitigate these effects, part-scale thermal modelling is essential.

In this work, thermal simulations are applied efficiently at multiple resolutions and levels of accuracy. Coarse, global simulations are used to capture the overall temperature field, which then serves as input for fine-grained, high-resolution thermal analyses. Based on these multi-scale simulations, optimization strategies for achieving more homogeneous and stable processing conditions are to be developed.



Place: Erlangen

Supervision:

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Responsible Professor: *Prof. Dr.-Ing. habil. Carolin Körner*

If interested, the supervisor can provide information on other possible topics in the field of simulation in additive manufacturing.

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