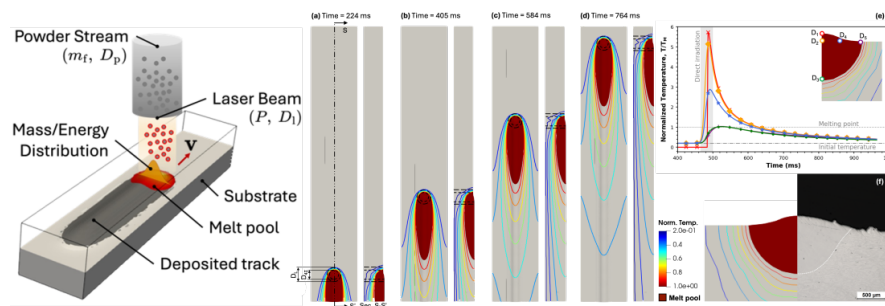




HiWi, ARL, Bachelor or Master Thesis topic available

## Process simulation of Direct Energy Deposition

at the Division of Mechanics of Functional Materials in the institute of Material Science, TU Darmstadt



### Motivation

Direct Energy Deposition (DED) is an additive manufacturing technique that uses a focused energy source to melt and deposit material layer by layer, enabling the production of complex components. It has numerous industrial applications due to the high precision it offers and the flexibility in material selection. Materials include several high strength alloys such as titanium alloys, stainless steel and nickel based alloys.

Process simulation plays a crucial role in predicting and controlling the additive manufacturing (AM) process, enabling the optimization of efficiency, quality, and reliability of the produced parts. The candidate will focus on simulating the DED process using the Fe20Cr material system. Thermo-structural evolution and effects of process parameters are to be studied.

### Methods

- Finite element method

### To Do

- Phase field simulation of DED process
- Thermo-structural evolution during the DED process
- Study the effects of process parameters on melt pool size

### Interested? Please Contact:

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FB 11 – Material- und  
Geowissenschaften

Fachgebiet  
Mechanik funktionaler  
Materialien

MECHANICS of  
FUNCTIONAL  
MATERIALS

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