

Development of an innovative model for the simulation of the microstructure and crack formation in laser beam melting (BA/SA/MA)

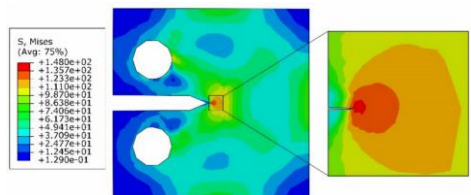
Initial simulation

As part of its research activities, the additive manufacturing department at the Institute for Machine Tools and Industrial Management (*iwb*) is working on increasing the process understanding of the laser beam melting of metals (LBM). The LBM process is characterized in particular by the fact that the manufactured components have a unique microstructure. The latter significantly influences the crack toughness in later use.

Scope of work

Starting from an existing approach based on the finite element method (FEM), a suitable model for simulating the development of the microstructure during the laser beam melting process is to be coupled with an innovative crack model as part of this work. Furthermore, these models are to be extended to include the special features

of additive manufacturing. The implementation will be carried out in C, Fortran and Julia in particular. A final comparison of the simulations with experimental results completes the work.



FEM crack simulation during LBM

Prerequisites

- Interest in FEM simulations and material science
- ideally, programming experience in C, Fortran, and Julia
- flawless German and/or English skills

Contact

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