

PART-SCALE NUMERICAL AND EXPERIMENTAL ANALYSIS FOR METAL ADDITIVE MANUFACTURING

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ABSTRACT

The mini-symposium aims to share the most recent achievements in the numerical simulation and experimental analysis of metal Additive Manufacturing (AM) processes at the component scale. This includes Wire Arc Additive Manufacturing (WAAM), Direct Energy Deposition (DED), and Laser Powder Bed Fusion (LPBF) technologies, among others. Multi-physics and multi-scale models are welcome as well as in-situ monitoring for calibration, validation, or qualification of the printed components.

The topics of interest are:

- Novel space discretization techniques and time integration schemes for accurate and efficient simulations at the part-scale
- Efficient numerical schemes, solvers, and algorithms tailored for part-scale AM simulation
- Multi-scale and multi-physic analysis
- Reduced Order Modeling for part-scale analysis
- Mitigation of residual stresses and warpage
- Material modeling including thermo-mechanical and microstructure coupling
- Microstructure and defect prediction induced by AM
- In-situ monitoring for calibration, validation and qualification
- Machine Learning techniques for the optimization of the AM process or the

qualification of the printed components

- Data-driven approaches
- Optimization of the process window and/or the necessary scanning strategy