

# EUROMAT 2021

EUROPEAN CONGRESS AND EXHIBITION  
ON ADVANCED MATERIALS AND PROCESSES

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12. - 16. SEPTEMBER 2021

GRAZ, AUSTRIA

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## Area C

### Symposium C 1

#### ***Title: Additive Manufacturing 1: Direct/beam-based techniques***

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#### **Abstract**

Additive manufacturing (AM) is widely acknowledged to be revolutionary. Direct (no sintering step required) AM techniques have attracted the most attention, both in industry and academia. The dominant direct techniques are Laser powder-Bed Fusion (LPBF), Electron Beam Melting (EBM) and direct energy deposition (DED), which offer new opportunities to manufacture parts in unique shapes with outstanding mechanical properties. The industrial application of these technologies is boosting during last decade with a demonstrated huge potential in mostly all industrial sectors (aerospace, medical/dental, automotive, etc.). Due to the high cooling rate, the high temperature gradient, the inherent process complexity and numerous interlinked process parameters, the microstructure and hence the mechanical properties of the LPBF/EBM/DED-components differ substantially from the properties of the same component produced by conventional techniques. At the same time, exploitation of these advantages opens new dimensions in material synthesis with tailored properties. This symposium aims to tackle all aspects of direct/beam-based additive manufacturing from powder production, material development, latest advances in processing, to final part qualification and characterization via process optimization. In particular, the following topics are addressed:

- Powder manufacturing process, characterization and effect on the AM process robustness
- Development of AM processed materials with novel composition or microstructure
- Relationships between process parameters and final part properties (microstructure, physical and mechanical properties,...)
- Standardization and final part qualification strategies
- Development of advanced machine concepts (new printing principles, automation, multiple materials printing, large scale printing, hybrid technologies, etc.)

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- Surface integrity of AM parts
- Design rules for AM and topological/multi-physics optimization
- Modelling and simulation applied to process and design (multi-functionality)
- Post treatment processes (surface finishing, heat treatment, machining, etc.)
- Machine learning in AM
- NDT and on-line process monitoring
- Life Cycle Assessment