

MSE 2024

24 - 26 Sep 2024 (Darmstadt)

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Topic P: Processing and Synthesis

P02: Inline monitoring of laser material processing

Laser processing is becoming increasingly important for a wide range of applications and industries, including joining processes (e.g. welding, thermal joining), cutting processes (e.g. ultrashort pulse machining, drilling) and additive manufacturing (e.g. laser powder bed fusion, laser direct energy deposition). Understanding the interaction between the laser beam and the material is essential for all processes in order to be able to describe the phenomena within the manufacturing process on the one hand and the resulting component properties on the other.

Inline monitoring techniques are particularly important for capturing and describing phenomena during processing, as they provide a deep understanding of mechanisms acting in production and additive manufacturing processes. The current focus of such investigations is to gain an understanding of the interaction between the laser beam and the material in various processes, in particular with respect to defect formation, non-destructive testing, quality control and related fields, e.g., recent developments for inline monitoring based on Artificial Intelligence (AI).

Addressing such areas of interest requires the use of modern measurement techniques and methods, including spectral and acoustic process emissions, optical measurements, fume analysis and high-speed characterization including synchrotron radiation or neutrons. Contributions addressing these topics as well as related issues or combined considerations with numerical simulation and/or AI, are of great interest. The focus of contributions can be either process-related or characterization-related.

This symposium will discuss the current state of the art, future trends and new developments in all aspects of in-situ characterization of laser materials processing.

Symposium Organizer



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