

Special Issue

Progress in Laser Advanced Manufacturing

Message from the Guest Editors

Laser advanced manufacturing of metals is a process characterized by multi-temporal, multi-spatial, multi-physics strong coupling. Taking metal laser welding as an example, the energy distribution from the high-power density laser beam, the temperature field, the velocity field, the concentration field of the melt pool, the thermal stress, and the deformation is directly coupled, resulting in different joint performances. The interaction between laser photons and atoms of materials occurs on a microscale, the formation of the melt pool together with heat and mass transfer occurs on a mesoscale, and thermal deformation occurs on a macroscale. The multi-scale coupling and cross-scale effect are key features for metal manufacturing using laser beams.

This Special Issue is organized to publish state-of-the-art works which aim to explore new ideas, new points, and new conclusions surrounding these challenges in laser advanced manufacturing. Manuscripts focused on insightful experimental devices or strategies, novel numerical modeling methods, and promising data-driven models assisted by artificial intelligence are especially welcomed for submission to this Special Issue.

Guest Editors

Prof. Dr. Gang Yu

Institute of Mechanics, Chinese Academy of Sciences, Beijing 100190, China

Dr. Zhiyong Li

Institute of Mechanics, Chinese Academy of Sciences, Beijing 100190, China

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Editorial Office

MDPI, Grosspeteranlage 5

4052 Basel, Switzerland

Tel: +41 61 683 77 34

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About the Journal

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Metallic materials play a vital role in the economic life of modern societies; contributions are sought on fresh developments that enhance our understanding of the fundamental aspects related to the relationships between processing, properties and microstructure – disciplines in the metallurgical field ranging from processing, mechanical behavior, phase transitions and microstructural evolution, nanostructures, as well as unique metallic properties – inspire general and scholarly interest among the scientific community.

Editors-in-Chief

Prof. Dr. Hugo F. Lopez

Department of Materials Science and Engineering, College of Engineering & Applied Science, University of Wisconsin-Milwaukee, 3200 N. Cramer Street, Milwaukee, WI 53211, USA

Prof. Dr. Yong Zhang

Beijing Advanced Innovation Center of Materials Genome Engineering, State Key Laboratory for Advanced Metals and Materials, University of Science and Technology Beijing, 30 Xueyuan Road, Beijing 100083, China

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