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The effect of individual input parameters on the development of imperfections during selective laser melting

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Selective Laser Melting (SLM) is a near net-shape manufacturing process where components of varying complexity are built up layer-by-layer by selectively melting metal powder. While gaining popularity in the Automotive and Aerospace industries, these SLMed components often suffer from process induced imperfections which may lead to undesired mechanical behavior in the final product. Taking an analysis of variation approach, this study aims to investigate the contribution of the individual input parameters, including laser power, hatch spacing, and scanning speed, to the development of imperfections such as balling, oxidation, and improper melting of powder. The analysis was carried out using single layer printing of 304 Austenitic Stainless Steel as a model material. Understanding the relations between these input parameters and the development of imperfections in terms of volumetric energy density can lead to the optimization of the SLM process.

Biography

Tilita George Alexandru studied Manufacturing and Industrial Engineering for Bachelor's and Master's at the "Politehnica" University of Bucharest with a specialization in Nanotechnology and Non-conventional manufacturing systems such as EDM, Additive Manufacturing, and others. He is now undergoing his PhD studies at the Hong Kong University of Science and Technology in the field of Selective Laser Melting. He is the recipient of the URG's HK PhD Fellowship.

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