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Influence of the scanning strategy on the residual stress state in IN 718 additive manufactured parts

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Laser Powder Bed Fusion (L-PBF) is an additive manufacturing technique enabling the design of complex geometries that are unrivalled by conventional production technologies. Nevertheless, L-PBF process is known to induce a high amount of residual stresses (RS) due to the high temperature gradients present during powder melting by laser. High tensile residual stresses are to be found the edges whereas the bulk material shows balancing compressive RS. Literature shows that the RS is highly sensitive to the process parameters. In particular, this study presents the characterization of the RS state in two L-PBF parts produced with a rastering scan vector that undergoes 90° or 67° rotation between subsequent layers.

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