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Effect of joint gap on bead formation in laser butt welding of stainless steel

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Abstract:

Simulations and experiments of laser butt welding are presented in the paper with the laser beam travelling along an inclined line across the gap. Full penetration was observed when the laser beam focused on the gap, while partial penetration was achieved when the laser beam deviated from the gap. A three-dimensional numerical model coupled with a ray tracing algorithm was established to investigate and compare the transient dynamics of the keyhole, molten pool and laser induced plume. The shape of the simulation cross-sections of the welds show good agreement with the experimental results. The gap contributed to transmission of laser beam energy deep into the inner part of the

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