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modelling of the nanosecond pulse laser interaction with a titanium target

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In this paper we present a numerical modeling of a nanosecond laser pulse interaction with a titanium target. We investigate the influence of the ambient gas pressure and the laser irradiance on the target heating, melting, vaporization and the resulting plume formation and expansion processes. The resulting plume expansion in argon background gas is studied using the species transport model. The heat transfer in the solid target and the molten material are modeled by a two dimensional approach using an enthalpy formulation for the solid-liquid phase changing. The algebraic equations are discretized by the finite volume method implemented by Fluent CFD softwares. The calculation results of plume expansion velocity, density, temperature and ionization degrees in the plume are presented.

Keywords
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