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Laser Ablation: Effect on Ambient Pressure on Titanium Plume Expansion Dynamics FARIDA HAMADI, EL-HACHEMI AMARA, CDTA, LASER MATERIAL PROCESSING TEAM — In this paper we present a numerical modeling of a nanosecond laser pulse interaction with a titanium target. We investigate the vapor plume formation and the influence of the ambient gas pressure on plume expansion dynamics. The vapor plume formation depends on the results of the heat transfer in the solid target modeling. The solid-liquid phase changing is modeled by a two dimensional approach using an enthalpy formulation. The resulting plume expansion in argon background gas is studied using the species transport model. 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.

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