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Using the Richtmyer-Meshkov flow to infer the strength of LY-12 aluminum at extreme conditions JIANWEI YIN, HAO PAN, Institute of Applied Physics and Computational Mathematics, Beijing, JIANGXIANG PENG, Institute of Fluid Physics, Chinese Academy of Engineering Physics, Mianyang, ZI-HUI WU, Institute of Applied Physics and Computational Mathematics, Beijing, YUYING YU, Institute of Fluid Physics, Chinese Academy of Engineering Physics, Mianyang, XIAOMIAN HU, Institute of Applied Physics and Computational Mathematics, Beijing — An improved analytical model of the Richtmyer-Meshkov (RM) flow in the elastoplastic materials is presented in this paper. This model describes the stabilization by yield strength (Y) effect on the RM flow in solids and linear relationships between initial configurations of perturbation and the growth. Then we make use of the model to analysis the explosion driven RM flow experiments with solid LY12 and test our model by comparing the predicted Y of existing strength models. Finally, we perform a plate impact experiment with solid LY12 aluminium alloy to validate our model and infer Y is about 1.23 GPa for a 28 GPa shock and a strain rate of 7.5×10^6

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