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Hydrodynamic simulations of microjetting from shock-loaded grooves CAROLINE ROLAND, THIBAUT DE RESSEGUIER, Institut Pprime, CNRS, ENSMA, 86961 Futuroscope, France, ARNAUD SOLLIER, EMILIEN LESCOUTE, LAURENT SOULARD, CEA, DAM, DIF, 91297 Arpajon, France, DIDIER LOISON, Institut de Physique de Rennes, CNRS, U. Rennes 1, 35042 Rennes, France — The interaction of a shock wave with a free surface presenting geometrical defects, such as cavities or grooves, may lead to the ejection of micrometric debris at velocities of km/s order. This process can be involved in many applications, like pyrotechnics or industrial safety. Laser shock experiments reported in this conference (T. de Resseguier, C. Roland et al., abstract ref.000066) provide insight into jet formation and peak velocities for various groove angles and shock pressures. Here, we present hydrodynamic simulations of these experiments, in both 2D and 3D geometries, using both finite element method and smoothed particles hydrodynamics. Numerical results are compared to several theoretical predictions including the Richtmyer-Meshkov instabilities. The role of the elastic-plastic behavior on jet formation is investigated. Finally, the possibility to simulate the late stages of jet expansion and fragmentation is explored, to evaluate the mass distribution of the ejecta and their ballistic properties, still essentially unknown in the experiments.

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