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Characterizing Laser-Driven Metal Ejecta Interactions[1] A. SAUNDERS, C. STAN, K. MACKAY, S. ALI, Lawrence Livermore Natl Lab, H. RINDERKNECHT, Laboratory for Laser Energetics, H.-S. PARK, J. EGGERT, F. NAJJAR, B. MORGAN, T. HAXHIMALI, J. HORWITZ, Y. PING, Lawrence Livermore Natl Lab — The study of metal ejecta interactions has broad applicability to fields ranging from particle dynamics modeling to materials physics [1]. Recent experiments at laser facilities have begun to study ejecta formation [2], but there exist few examples of ejecta interaction studies. We present the first movies of ejecta-ejecta interactions from experiments performed on the OMEGA and EP lasers. Lasers drive shocks through two tin metal foils with planar trenches carved into their back sides. As the shocks break out, the trench features invert to form planar jets of micron-sized ejecta moving towards each other at speeds of several km/s. We use point-projection radiography to image the interacting jets. Jets emerging from tin releasing into solid are observed to have areal densities and volume fractions of 0.5 mg cm-2 and 0.25%, respectively, whereas jets emerging from tin releasing into liquid have densities and volume fractions nearly three times greater. We discuss the observed interaction dynamics for both conditions. [1] W. T. Buttler et al., J. Dyn. Behav. Mater. 3(2), 151–155 (2017). [2] T. de Rességuier et al., J. Appl. Phys. 124, 065106 (2018).

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