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2D characterization of the pressure generated by an intense laser pulse on an aluminum target BERTRAND AUBERT, DAVID HEBERT, JEAN-LUC RULLIER, CEA CESTA, Le Barp, EMILIEN LESCOUTE, LAURENT VIDEAU, CEA DIF, Arpajon, LAURENT BERTHE, CNRS PIMM, Paris — High intensity lasers are a very powerful tool to study the mechanical properties of materials, such as equations of state, or dynamic fracture. In the first case, laser experiments are usually designed so as to allow 1D interpretation of the measurements. However, as regards the characterization of material strength, it can be useful to take advantage of 2D effects that are due to the finite size of the laser focal spot, for instance in cratering experiments on thick samples. In this paper, we present an experimental study of the 2D mechanical loading generated by the interaction of a high power laser (40 J, 100 ns) with aluminum targets. The focal spot diameter is approximately 0.25 mm. Under such conditions, the pressure generated on the sample by the ablation process can reach 25 GPa. In our experiments, targets were 0.2 mm thick aluminum plates, and a VISAR was used to record the free surface velocity at various positions off the symmetry axis. The radial dependence of the mechanical loading was then deduced from these measurements and compared to the radial intensity profile. Some differences are observed and discussed, as well as their consequences on cratering experiments.

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