

Abstract Submitted
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Probing off-Hugoniot states in Ta, Cu, and Al to 10 Mbar compression with magnetically driven liner implosions T.R. MATTSSON, R.W. LEMKE, D.H. DOLAN, D.G. DALTON, J.L. BROWN, G.R. ROBERTSON, M.D. KNUDSON, E. HARDING, A.E. MATTSSON, J.H. CARPENTER, R.R. DRAKE, K. COCHRANE, A.C. ROBINSON, Sandia National Laboratories, K. TOMLINSON, General Atomics, B.E. BLUE, Lawrence Livermore National Laboratory — We report on a technique for obtaining off-Hugoniot equation of state data on solid metals by a magnetically driven cylindrical liner implosion on Sandias Z-machine (Z). The sample material is in an inner tube with an outer tube composed of Al that serves as the current carrying cathode. A shaped current pulse quasi-isentropically compresses the sample as it implodes. Photonic Doppler velocimetry measures the implosion velocity of the free inner surface of the sample material, and the explosion velocity of the return current anode free outer surface. The velocimetry measurements are used in conjunction with magnetohydrodynamic simulations and optimization to infer pressure and density in the sample. Results are presented for experiments on the Z-machine in which Ta, Cu, and Al samples were compressed to peak pressure 10 Mbar. Sandia National Laboratories is a multi-program laboratory managed and operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corporation, for the U.S. Department of Energys National Nuclear Security Administration under contract DE-AC04-94AL85000.

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