

Abstract Submitted
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Measurement of dynamic strength at high pressures using magnetically applied pressure-shear (MAPS) on the Sandia Z accelerator¹ C.S. ALEXANDER, T.A. HALL, D.G. DALTON, D.C. ROVANG, D.C. LAMPPA, Sandia National Laboratories — The recently developed magnetically applied pressure-shear (MAPS) technique used to measure dynamic material strength at high pressures on magneto-hydrodynamic (MHD) drive pulsed power platforms has been implemented on the Sandia Z accelerator. MAPS relies on an external magnetic field normal to the plane of the MHD drive current to directly induce a shear stress wave in addition to the usual longitudinal stress wave. This shear wave is used to directly probe the strength of a sample. By implementing this technique on Z, far greater pressures can be attained than were previously available using other MHD facilities. In addition, the use of isentropic compression will limit sample heating allowing the measurement to be made at a much lower temperature than under shock compression. Details of the experimental approach, including design considerations and analysis of the results, will be presented along with the results of Z experiments measuring the strength of tantalum at pressures up to 50 GPa, a five-fold increase in pressure over previous results using this technique.

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