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Investigating hydrodynamic instabilities in high energy density systems on the Z Machine D. A. YAGER-ELORRIAGA, P. F. KNAPP, Sandia National Laboratories, F. W. DOSS, Los Alamos National Laboratory, M. R. MARTIN, D. E. RUIZ, C. JENNINGS, A. J. PORWITZKY, C. E. MYERS, L. SHULENBURGER, T. MATTSSON, Sandia National Laboratories — We present experimental data for two platforms investigating the Richtmyer-Mehskov process and interfacial feedthrough on the Z Machine at Sandia National Laboratories. Cylindrical liners filled with liquid deuterium are magnetically imploded with >20 MA of current, driving a converging shock that propagates towards the central axis and generating a high plasma-beta system suitable for investigating HED hydrodynamical processes. The first platform investigates the interaction of this shock with a solid beryllium rod machined with sinusoidal perturbations that grow due to the Richtmyer-Meshkov process. The second platform replaces the on-axis rod with a cylindrical liner, enabling investigation of the feedthrough of these instabilities to the inner liner surface. Finally, future experimental platforms presently under development will be discussed, including (1) a variant where the outer cylindrical liner is replaced with a quasi-spherical liner to drive strong converging shocks that interact with a nested spherical target, enabling the investigation of Bell-Plesset effects, and (2) an exploding cylindrical liner system to study the Rayleigh-Taylor instability driven for >100 ns to a highly nonlinear regime. SNL is managed and operated by NTESS under DOE NNSA contract DE-NA0003525 and LANL is managed and operated by Triad National Security under DOE NNSA contract 89233218CNA000001

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