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Two Experiments for Studying Feedthrough of Instabilities and Mix[1] F. W. DOSS, E. C. MERRITT, C. A. DI STEFANO, T. DESJARDINS, Los Alamos National Laboratory, P. F. KNAPP, D. YAGER-ELORRIAGA, Sandia National Laboratories — Understanding the impact of hydrodynamic perturbations transmitted through thin, dense layers is important for inertial confinement fusion ignition schemes, particularly double- or multi-shell systems. Experiments to validate our understanding are challenging as they necessarily involve multiple interfaces, materials, transmitted and reflected shocks, etc. Two recent and ongoing experiments, one laser-driven design fielded at the National Ignition Facility, and one pulsed-power-driven design for the Sandia Z Machine, test and validate aspects of transmitted instability theory and feedthrough, including the qualitative difference in behavior between long and short wavelength modes: the buckling of the layer by long modes into imprinted shapes, and the cumulative impact of short modes leading to mix. Recent improvements in analysis have demonstrated how, beyond integral measures such as dominant wavelength and mix width, higher-order metrics such as material variances may also be extracted from the diagnostics and compared with theory and simulation.

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