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Aluminum Ablator Determination of Shock Strength using a Two-Shock Drive[1] S.G. GLENDINNING, K.L. BAKER, P.M. CELLIERS, T.R. DITTRICH, S.J. FELKER, S.A. MACLAREN, D. MARTINEZ, H.S. PARK, R.M. SEUGLING, V.A. SMALYUK, LLNL, T.M. GUYMER, S. MCALPIN, A.S. MOORE, AWE — We have designed and performed experiments on NIF using an aluminum ablator coupled to a spherical fused silica window to allow accurate measurements of shock breakout and shock velocity in the fused silica. Igniting capsules for intertial confinement fusion must be driven by a succession of shocks to maintain a low adiabat. However, uncertainties in laser-hohlraum coupling translate into uncertainties in shock timing, and investigation of such integrated problems is difficult. Thus, a simpler experiment using a smaller number of shocks (two in this case) and an ablator material of well-known opacity and equation of state (aluminum) might allow a more fundamental investigation of possible laser-plasma coupling issues. The drive was a double-peaked laser pulse 5.5 ns long using 280 kJ into a gold cylindrical hohlraum (vacuum interior) 3.3 mm radius X 10 mm length. This produced an x-ray drive of near-constant radiation temperature of 150 eV for 3.5 ns followed by a 1 ns wide peak at about 195 eV. The fused silica was shielded from gold M-band emission from the hohlraum using a thin Au layer. We will present simulations and experimental results and show a comparison with a four-shock drive result in an ignition hohlraum.

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