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Precision Shock Timing Measurements to set the Fuel Adiabatic in Ignition Implosions¹

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An experimental campaign to tune the initial shock compression sequence of capsule implosions on the National Ignition Facility (NIF) was initiated in late 2010. The experiments use a NIF ignition-scale hohlraum and capsule that employs a re-entrant cone to provide optical access to the shocks as they propagate in the liquid deuterium-filled capsule interior. The strength and timing of the shock sequence is diagnosed with velocity interferometry that provides target performance data used to set the pulse shape for ignition capsule implosions that follow. From the start, these measurements yielded significant new information on target performance, leading to improvements both in the target design and in the physics packages in the radiation-hydrodynamic codes used to design and model these targets. We can set an accurately tuned pulse shape within a series of approximately 5 shots. The results and interpretation of these tuning experiments will be described. In collaboration with: T.R. Boehly, H.F. Robey, J.L. Kline, D.R. Farley, S. Le Pape, J.D. Moody, R.E. Olson, D.H. Munro, J.L. Milovich, P.A. Sterne, O.S. Jones, D.A. Callahan, A. Nikroo, J.J. Kroll, J.B. Horner, A.V. Hamza, S.D. Bhandarkar, J.H. Eggert, R.F. Smith, D.G. Hicks, H.-S Park, B.K. Young, W.W. Hsing, G.W. Collins, O.L. Landen and the NIC team.

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