

Abstract Submitted
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First streaked radiography experiments of indirect drive ICF capsule implosions on the National Ignition Facility¹ E. DEWALD, A. MACK-INNON, R. TOMMASINI, N. MEEZAN, D. HICKS, LLNL, R. OLSON, SNL, S. PRISBEY, Y.P. OPACHICH, D. KALANTAR, A. MACPHEE, S. KHAN, B. HATCH, C. BAILEY, B. EHRLICH, D. BRADLEY, P. BELL, S. GLENZER, O. LANDEN, B. MACGOWAN, LLNL, J. KILKENNY, GA, J. EDWARDS, B. VAN WONTERGHEM, E. MOSES, LLNL, NATIONAL IGNITION CAMPAIGN TEAM — 1-dimensional (slit imaging) time resolved radiography of capsule implosions in ignition hohlraums on the National Ignition Facility (NIF) is used to measure the time history of implosion velocities, ablator shell thickness and remaining ablator mass in the last 5 ns before peak implosion time [1]. While first experiments on the NIF performed with gated imagers recorded these quantities at four adjustable times, streaked radiography [2] adds the tremendous benefit of recording the full implosion evolution through capsule stagnation and explosion phase. First streaked radiography experiments of Si doped indirect drive ignition capsule surrogates with an initial radius of 1.1 mm successfully measured implosion performance with required accuracies at radii in the 0.9 to 0.2 mm range. These experiments were performed in Au and Au/DU gas filled ignition hohlraums driven by laser pulses with a peak power in the 330-420 TW range and total laser energy up to 1.8 MJ. Data quality and inferred statistical uncertainties in implosion velocity, remaining mass and capsule thickness will be discussed. [1] O.L. Landen et al, Phys. Plasmas 18, 051002 (2011). [2] D.G. Hicks et al, Phys. Plasmas 17, 102703 (2010).

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