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Three-Dimensional Gated Hot-Spot X-ray Imaging on OMEGA
S.T. IVANCIC, F.J. MARSHALL, W. THEOBALD, C. SORCE, I. IGUMENSHCHEV, S. REGAN, R.C. SHAH, J.P. KNAUER, V.N. GONCHAROV, R. BETTI, T.C. SANGSTER, Laboratory for Laser Energetics, U. of Rochester — The time-dependent morphology of the hot-spot x-ray emission from laser direct drive inertial confinement fusion capsules at stagnation provides a key observable in the assessment of implosion performance. The size, shape and offset of the stagnated fuel is the product of multidimensional effects arising from laser beam imbalance, capsule non-uniformity, the target stalk, and the initial target offset. Cryogenic deuterium-tritium layered implosions on the 60-beam, 30-kJ, 351-nm OMEGA Laser System are observed along two semi-orthogonal lines of sight (LOS) with gated x-ray imagers capable of 30-ps temporal resolution and <10-μm spatial resolution. A third gated LOS imager, which is nearly orthogonal to the others, will be added to capture the three-dimensional nature of the hot spot. Synchronized observations of the hot-spot size and shape inferred from 4- to 9-keV thermal x rays measured along the two LOS will be presented. 3-D hydrodynamic simulations of the implosions with the code ASTER are used to assess what information of the hot-spot morphology can be inferred by combining multiple gated LOS imaging. This material is based upon work supported by the Department of Energy National Nuclear Security Administration under Award Number DE-NA0003856.

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