Abstract Submitted
for the DPP12 Meeting of
The American Physical Society

Using Orthogonal Images to Infer Spatial Variations in Opacity of Remaining Ablator and Fuel Mass in Imploding Capsules LAURA ROBIN BENEDETTI, DAVID BRADLEY, STEVEN GLENN, NOBUHIKO IZUMI, SHAHAB KHAN, Lawrence Livermore National Laboratory, GEORGE KYRALA, Los Alamos National Laboratory, TAMMY MA, ART PAK, VLADIMIR SMALYUK, RICCARDO TOMMASINI, RICHARD TOWN, Lawrence Livermore National Laboratory — Experiments at the National Ignition Facility attempt to achieve laser-driven inertial confinement fusion by imploding a capsule of DT fuel. In order to achieve sufficient density and temperature to drive nuclear fusion, the imploding capsule must be both highly convergent and highly symmetric. X-ray self-emission from imploding capsules is imaged for size and symmetry along two orthogonal axes by time-integrated (image plates) and time-resolved (framing cameras) diagnostics. Differences in emission along these axes indicate either an anisotropic hot core or anisotropy in total optical depth of the remaining ablator and fuel mass. We compare integrated emission intensity along a common-line-of-sight to further remove the ambiguity between anisotropy of emission and absorption. While we find good correlation for some recent NIF implosions (indicating isotropic or optically thin remaining mass), we find significant variations for others, suggesting an observable anisotropy in the thickness or density of the remaining mass. These results may help explain observations of asymmetric neutron yield. This work performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under Contract DE-AC52-07NA27344, LLNL-ABS-564186.

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Date submitted: 24 Jul 2012 Electronic form version 1.4