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Measurement of Hot-spot Velocity and Ion Temperature in Inertial Confinement Fusion Implosions Using Fused-silica Cherenkov Detectors. ALASTAIR MOORE, EDWARD HARTOUNI, DAVID SCHLOSSBERG, MARK ECKART, CORY WALTZ, Lawrence Livermore Natl Lab, MICHAEL RUBERY, AWE Aldermaston, GARY GRIM, Lawrence Livermore Natl Lab — Uniform symmetric drive is critical to optimizing inertial confinement fusion (ICF) implosions at the National Ignition Facility (NIF). Drive imbalance can result in motion of the hot-spot and residual kinetic energy upon stagnation which degrades the implosion performance. At the NIF the neutron time-of-flight (nToF) detector suite has been upgraded to include fused-silica Cherenkov detectors on each of four collimated lines of sight. Cherenkov nToF detectors exceed the performance of traditional scintillators by providing an energy thresholded measurement of gamma rays emitted by the target and a short (sub-ns) instrument response function that reduces systematic uncertainties in analyzing the neutron spectrum. Measurements from cryogenic deuterium-tritium (DT)-layered implosion experiments are analyzed to obtain hot-spot velocity, ion temperature and fuel density via the down-scattered neutron spectrum. Results from a range of DT-layered implosions are presented and compared to independent measurements from existing scintillator nToF detectors. LLNL-ABS-786737 Prepared by LLNL under Contract DE-AC52-07NA27344.

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