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2.40 Multiple nuclear burn history measurements using Cherenkov -ray detectors

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Thermonuclear burn history measurements are an important diagnostic of inertial fusion implosion performance, with several instruments developed based on the Cherenkov technique. Depending on the target composition and fuel, several nuclear reactions can produce g rays at different energies. We present a new technique that uses multiple detectors, with varied thresholds, to simultaneously measure multiple -ray burn histories with high relative precision. The first application of this technique has been to measure both DT and HT burn from deuterated plastic shell targets filled with H2+T2 gas and imploded on the OMEGA laser facility. These data will constrain models of material mixing from the shell into the fuel, and kinetic phenomena in implosions. Future applications, including measurements at the NIF, will be discussed.

Primary author(s) : ZYLSTRA, Alex (LANL)

Co-author(s) : HERRMANN, Hans (LANL); KIM, Yongho (LANL); SCHMITT, Mark (LANL); HOFFMAN, Nelson (LANL); MCEVOY, Aaron (LANL); HALE, Gerry (LANL); MEANEY, Kevin (LANL); GEPPERT-KLEINRATH, Hermann (LANL); LEATHERLAND, Alex (AWE); GALES, Steven (AWE); GLEBOV, Vladimir (LLE); FORREST, Chad (LLE); STOECKL, Christian (LLE)

Presenter(s) : ZYLSTRA, Alex (LANL); HERRMANN, Hans (LANL); KIM, Yongho (LANL); SCHMITT, Mark (LANL); HOFFMAN, Nelson (LANL); MCEVOY, Aaron (LANL); HALE, Gerry (LANL); MEANEY, Kevin (LANL); GEPPERT-KLEINRATH, Hermann (LANL); LEATHERLAND, Alex (AWE); GALES, Steven (AWE); GLEBOV, Vladimir (LLE); FORREST, Chad (LLE); STOECKL, Christian (LLE)

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