Time-Resolved Measurements of the Hot Spot Density and Temperature on the National Ignition Facility

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The electron density and temperature and their evolution in the hot spot of a Kr-doped, big-foot implosion target were measured for the first time using an absolutely calibrated, streaked, high-resolution x-ray spectrometer DHIRES on the National Ignition Facility (NIF) [1]. Kr Heα and Heβ complexes near stagnation were recorded on a streak camera with a temporal resolution of ~30 ps, with signal levels provided by a simultaneous time-integrated measurement on the image plate. The electron density was inferred through stark-broadened line shapes and the temperature was derived from the relative intensities of dielectronic satellites. This presentation will present first experimental measurements of Kr spectra for big-foot implosions [2], with and without W dopant in the ablator. The measurements are compared with hydrodynamic simulations using Lasnex [3], as well as collisional-radiative calculations for line intensities and shapes using Cretin [4].

References:


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