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Measurement of the hot spot electron temperature in NIF ICF implosions using Krypton x-ray emission spectroscopy T. MA, H. CHEN, P.K. PATEL, M. SCHNEIDER, M. BARRIOS, L. BERZAK HOPKINS, D. CASEY, Lawrence Livermore National Laboratory, H.-K. CHUNG, International Atomic Energy Agency, B. HAMMEL, C. JARROTT, R. NORA, A. PAK, H. SCOTT, B. SPEARS, C. WEBER, Lawrence Livermore National Laboratory — The inference of ion temperature from neutron spectral measurements in indirect-drive ICF implosions is known to be sensitive to non-thermal velocity distributions in the fuel. The electron temperature (Te) inferred from dopant line ratios should not be sensitive to these bulk motions and hence may be a better measure of the thermal temperature of the hot spot. Here we describe a series of experiments to be conducted on the NIF where a small concentration of a mid-Z dopant (Krypton) is added to the fuel gas. The x-ray spectra is measured and the electron temperature is inferred from Kr line ratios. We also quantify the level of radiative cooling in the hot spot due to this mid-Z dopant. These experiments represent the first direct measurement of hot spot Te using spectroscopy, and we will describe the considerations for applying x-ray spectroscopy in such dense and non-uniform hot spots. This work performed under the auspices of U.S. Department of Energy by Lawrence Livermore National Laboratory under Contract DE-AC52-07NA27344.

T. Ma
Lawrence Livermore National Laboratory

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