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NLTE Radiative Cooling in ICF Capsule Implosions[1] KYLE J. PETERSON, G.A. ROCHAU, J.E. BAILEY, T.A. MEHLHORN, Sandia National Labs, I. GOLOVKIN, J.J. MACFARLANE, Prism Computational Sciences, R.C. MANCINI, University of Nevada — NLTE radiation cooling of ICF capsule implosions was simulated with HELIOS-CR, a 1D hydrodynamic code that includes inline collisional-radiative physics for modeling non-LTE time- dependent kinetics. The effects of Krypton and Argon line emission on implosion dynamics and characteristic target signatures will be shown for Z-pinch dynamic hohlraum, NIF and Omega ICF targets. Z-pinch dynamic hohlraum simulations will also be compared with two series of experiments that have been conducted on Sandia National Laboratories Z facility to study the effect of non-LTE radiative cooling in Argon and Krypton doped capsule implosions. In these experiments, spectroscopic analysis was used to determine peak fuel conditions from capsules containing 24 atm of DD Fuel and 0.085 atm of Argon while varying Krypton dopant concentration at pressures of 0.01 atm, 0.04 atm, or 0.085 atm. Capsules studied were 2.0 mm in diameter with either a 50 or 70 μm thick CH shell. Experimental data analysis and comparison with post processed simulation results will be also presented.

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