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**Kr X-ray spectroscopy to diagnose Inertial Confinement Fusion implosions on the National Ignition Facility** ARATI DASGUPTA, NICHLAS OUART, JOHN GIULIANI, Naval Research Lavoratory, ROBERT CLARK, Berkeley Research Associates, MARILYN SCHNEIDER, HOWARD SCOTT, Lawrence Livermore National Laboratory — X ray spectroscopy is used on the National Ignition Facility (NIF) at the Lawrence Livermore National Laboratory (LLNL) to diagnose the plasma conditions in the ignition target in indirect drive Inertial Confinement Fusion (ICF) implosions [1]. A platform is being developed at NIF where small traces of krypton are used as a dopant to the fuel gas for spectroscopic diagnostics using krypton line emissions. Simulations of the krypton spectra using a small atomic fraction of krypton in direct-drive exploding pusher with a range of electron temperatures and densities show discrepancies when different atomic models are used. We use our non-local thermodynamic equilibrium (non-LTE) atomic model with a detailed fine-structure level atomic structure and collisional-radiative rates to investigate the krypton spectra at the same conditions and generate synthetic spectra with a detailed frequency-by-frequency radiation transport scheme from the emission regions of interest to analyze the experimental data and compare and contrast with the existing simulations at LLNL. [1] T. Ma, et al., RSI 87 (2016). Work supported by DOE/NNSA; Part of this work was also done under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under Contract No DE-AC52-07NA27344.

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