

Abstract Submitted  
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**Kr X-ray spectroscopy to diagnose NIF ICF implosions**<sup>1</sup> A. DAS-GUPTA, N. OUART, J. L. GIULIANI, Naval Research Lab, R. W. CLARK, Berkeley Research Associates, M. B. SCHNEIDER, H. A. SCOTT, H. CHEN, T. MA, Lawrence Livermore National Lab, J. P. APRUZESE, Engility Corporation — X ray spectroscopy is used on the NIF to diagnose the plasma conditions in the ignition target in indirect drive ICF implosions [1]. High-energy emission spectra from mid to high atomic number elements can provide estimates of electron temperature near stagnation of an ICF implosion. 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. The fraction of krypton dopant was varied in the experiments and was selected so as not to perturb the implosion. Simulations of the krypton spectra using a 1 in 104 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-LTE atomic model with a detailed fine-structure level atomic structure and collisional-radiative rates to investigate the krypton spectra at the same conditions. Synthetic spectra are generated with a detailed multi-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. <sup>1</sup> T. Ma, et al., RSI submitted (2016)

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