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Simulation of Ge Dopant Emission in Indirect-Drive ICF Implosion Experiments JOSEPH MACFARLANE, I. GOLOVKIN, Prism Computational Sciences, S. REGAN, R. EPSTEIN, University of Rochester, R. MANCINI, University of Nevada-Reno, K. PETERSON, Sandia Natonal Laboratories, L. SUTER, Lawrence Livermore National Laboratories — We present results from simulations performed to study the radiative properties of dopants used in inertial confinement fusion indirect-drive capsule implosion experiments on NIF. In Rev5 NIF ignition capsules, a Ge dopant is added to an inner region of the CH ablator to absorb hohlraum x-ray preheat. Spectrally resolved emission from ablator dopants can be used to study the degree of mixing of ablator material into the ignition hot spot. Here, we study the atomic processes that affect the radiative characteristics of these elements using a set of simulation tools to first estimate the evolution of plasma conditions in the compressed target, and then to compute the atomic kinetics of the dopant and the resultant radiative emission. Using estimates of temperature and density profiles predicted by radiation-hydrodynamics simulations, we set up simple plasma grids where we allow dopant material to be embedded in the fuel, and perform multi-dimensional collisional-radiative simulations using SPECT3D to compute non-LTE atomic level populations and spectral signatures from the dopant. Recently improved Stark-broadened line shape modeling for Ge K-shell lines has been included. The goal is to study the radiative and atomic processes that affect the emergent spectra, including the effects of inner-shell photoabsorption and Kα reemission from the dopant, and to study the sensitivity of the emergent spectra to the dopant and the hot spot and ablator conditions.

Joseph MacFarlane
Prism Computational Sciences

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