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SPECT3D Post-Processing of LSP PIC Simulations: Application to Short-Pulse Laser Experiments JOSEPH MACFARLANE, P. WANG, I. GOLOVKIN, P. WOODRUFF, N. PEREYRA, Prism Computational Sciences, R. MANCINI, University of Nevada - Reno, D. WELCH, T. HUGHES, Voss Scientific, R. TOWN, Lawrence Livermore National Laboratory — In the fast ignition concept for inertial fusion energy, high-intensity short-pulse lasers (SPL) are used to create energetic particles (protons and relativistic electrons) that propagate to the fuel within a compressed capsule. To achieve a good understanding of energetic particle transport through dense plasmas, a combination of well-diagnosed experiments and high-quality simulation tools is required. In this study, we utilize the SPECT3D simulation package to post-process the results from LSP particle-in-cell (PIC) simulations to generate images and spectra that can be directly compared with experimental measurements. In doing this, we have updated the multi-dimensional collisional-radiative SPECT3D package to include the effects of both relativistic electrons and energetic proton beams that are generated in SPL experiments. Energetic particle effects are included in computing non-LTE atomic level populations, emergent spectra, and images for the target plasma. This procedure allows us to study diagnostic signatures arising from energetic particles. We will present example results from simulations and comparisons with available experimental data.

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