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Simulation of the Radiative Emission from Plasmas Based on LSP Particle-In-Cell Simulations JOSEPH MACFARLANE, IGOR GOLOVKIN, PAMELA WOODRUFF, Prism Computational Sciences, DALE WELCH, CARSTON THOMA, Voss Scientific, DOUGLAS WITHERSPOON, HyperV Technologies — Particle-in-cell (PIC) simulation codes are valuable tools in simulating the physical properties of plasmas in a wide variety of high energy density laboratory plasma experiments. Two examples of this are short-pulse laser experiments, which are used to study the fast ignition concept for inertial fusion, and plasma jet experiments, which are of interest to magnetic fusion and mageto-inertial fusion studies. The LSP code is a widely-used PIC simulation code that computes the detailed characteristics of electron and ion particle distributions in such experiments. To compute the radiative emission characteristics of plasmas based on PIC simulation predictions, we use the SPECT3D multi-dimensional collisional-radiative package to generate high-resolution spectra and images which can be compared with experimental measurements. SPECT3D includes the effects of energetic particles (including relativistic electrons) in computing non-LTE atomic level populations, emergent spectra, and images for the target plasma. We will present results for the radiative characteristics of plasmas created in short-pulse laser and plasma jet experiments.

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