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Parallel Implementation of Multi-Dimensional Spectral Code SPECT3D I.E. GOLOVKIN, J.J. MACFARLANE, P.R. WOODRUFF, P. WANG, Prism Computational Sciences, Inc — K-shell emission spectroscopy is commonly used to diagnose the core temperature and density of ICF plasmas. In particular, we will focus on the analysis of Ar doped capsule implosions and radiation driven doped foams. To this end, we utilize the multi-dimensional collisional-radiative, spectral analysis code SPECT3D. Comprehensive atomic models, including K-shell satellite and inner-shell transitions, are used so that very detailed spectra can be computed and compared with experimental spectra. Atomic level populations can be computed using time-dependent atomic kinetics, or a steady-state approximation. Calculations include the effects of bound-bound, bound-free, and free-free contributions to the plasma emission and opacity. Accurate accounting for radiation transport requires sophisticated atomic models that include a large number of energy levels and transitions. Additionally, the radiation field needs to be computed over a wide range of photon energies. Therefore, computational expense may push the limits of sequential computing. We will present a parallel implementation of the code and provide a scalability study performed on a Linux cluster.

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