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Spectroscopic and X-ray Scattering Models in SPECT3D IGOR GOLOVKIN, Prism Computational Sciences, Inc., GIANLUCA GREGORI, University of Oxford, JOSEPH MACFARLANE, IAIN HALL, PAMELA WOODRUFF, Prism Computational Sciences, Inc., JAMES BAILEY, ERIC HARDING, TOM AO, Sandia National Laboratories — Spectrally resolved X-ray scattering has become a very effective method for diagnosing the electron temperatures, densities, and average ionization of warm dense matter. We present a newly implemented capability to compute scattering from realistic experiment configurations, including the influence of plasma non-uniformities and collecting scattered x-rays from a range of angles. The method is based on a formalism developed by G. Gregori [1]. The x-ray scattering modeling has been added to the multi-dimensional collisional-radiative spectral and imaging package SPECT3D [2]. Ability to compute emissivity and attenuation of scattered photons within a multi-dimensional plasma with non-uniform temperature and density distributions adds major new functionality to existing models. We will discuss the implementation details and demonstrate results relevant to ongoing experimental investigations at Sandia National Laboratories.

[1] G. Gregori, S. H. Glenzer, W. Rozmus, R. W. Lee, and O. L. Landen, Phys. Rev. E 67, 026412 (2003).
[2] J. J. MacFarlane, I. E. Golovkin, P. Wang, P. R. Woodruff, and N. A. Pereyra, High Energy Density Phys., Vol. 3, p. 181-190 (2007).

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