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Spectroscopic Diagnostics Using Line-Radiation in Laser Driven Non-equilibrium Plasmas[1] ARATI DASGUPTA, NICHOLAS OUART, Naval Research Laboratory, GREGORY KEMP, Lawrence Livermore National Laboratory, HEATH LEFEVRE, University of Michigan, MARILYN SCHNEIDER, Lawrence Livermore National Laboratory, JOHN GIULIANI, Naval Research Laboratory — We investigate to diagnose plasma conditions of experiments performed at the Jupiter Laser Facility at the Lawrence Livermore National Laboratory, where X-ray spectroscopic measurements were acquired from sub-critical-density, Ti-doped silica aerogel foams driven by a 2ω laser at ~$5x10^{14}$ W/cm^2. The ultimate objective is to study the effect of an external B-field in thermally insulating the hot plasma and investigating line-radiation in multi-keV, non-equilibrium plasmas. However, the near-term goal is to infer a time-integrated temperature at several positions along the laser propagation axis for several B-field cases and observe any sensitivity to density with 4.5% of Ti by atomic fraction in SiO_2 foam target. We use our non-LTE atomic model with a detailed fine-structure level atomic structure and collisional-radiative rates to investigate the Ti spectra at the estimated plasma conditions of density and temperature conditions. Synthetic spectra are generated with a detailed multi-zone, 1D multi-frequency radiation transport scheme from the emission regions of interest to analyze the experimental data and compare and contrast with the existing simulations at LLNL.

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