Abstract Submitted
for the DPP20 Meeting of
The American Physical Society

Open L-Shell Spectroscopy of Non-local Thermodynamic Equilibrium Plasmas[1] DAVID BISHEL, PHIL NILSON, GILBERT COLLINS, Laboratory for Laser Energetics, U. of Rochester, EDWARD MARLEY, MARILYN SCHNEIDER, DUANE LIEDAHL, ROBERT HEETER, MARK FOORD, GREGORY KEMP, YECHIEL FRANK, JIM EMIG, LLNL, GABRIEL PEREZ-CALLEJO, Dept. of Physics, Clarendon Laboratory, U. of Oxford — Spectral modeling codes are commonly used to infer plasma conditions from measured spectra. However, at non-local thermodynamic equilibrium conditions common in high-energy-density environments, such models produce conflicting results for open-shell systems. Improving the underlying atomic models would improve inference capabilities in such systems, particularly for employing L-shell spectra as a sensitive density diagnostic where traditional K-shell techniques are limited. To begin to provide high-quality data that can discriminate between spectral codes, we present results of time-resolved, open L-shell Ge spectroscopy from Ge and Sc buried layers in 10-μm-thick Be irradiated by the OMEGA laser. Time-resolved temperature and density are constrained by Sc K-shell spectra and images of the emitting volume. Comparisons to the spectral model SCRAM are explored. This platform will enable systematic measurement of high-resolution, temporally-resolved spectra of open L-shell mid-Z elements.

[1]This material is based upon work supported by the Department of Energy National Nuclear Security Administration under Award Number DE-NA0003856 and under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under Contract DE-ABS-779883.

David Bishel
Laboratory for Laser Energetics, U. of Rochester

Date submitted: 29 Jun 2020 Electronic form version 1.4