

New Prism EOS and Opacity Tables with NLTE Atomic Kinetics

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We present new features of PROPACEOS, a code that generates equation-of-state (EOS) and opacity tables for radiation-hydrodynamics and spectroscopic simulations. In addition to existing capabilities to produce tables for LTE and optically thin NLTE plasmas, these new features allow PROPACEOS to perform calculations that include other effect of NLTE atomic kinetics. The primary purpose of this development is to facilitate efficient spectroscopic simulations for short-pulse laser experiments. The simulations are based on post-processing of PIC calculations and focus on the analysis of K-alpha/K-beta emission signatures. PROPACEOS can now produce emissivity and opacity databases on a grid with up to six independent parameters, for example: plasma temperature, plasma density, and hot electron parameters. Hot electron distributions are specified in terms of analytic functions [1]. We will also discuss new capabilities that allow for computing opacities for optically thick NLTE plasmas. We will present simulation results relevant to ongoing experiments on Omega EP laser facility.

References

[1] T. Walton, In preparation (2019).