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Numerical modeling of radiation physics in kinetic plasmas [II][1]
IOANA PARASCHIV, YASUHIKO SENTOKU, ROBERTO MANCINI, University of Nevada, Reno — X-ray radiation is an important feature of ultra-intense laser interactions with high Z materials. In order to take into account the radiation effects in the high energy density plasmas created by such interactions, we have modified the collisional particle-in-cell code PICLS to self-consistently model the x-ray radiation transport (RT). Solving the equation of radiation transport requires the creation of a non-LTE database of emissivities and opacities as functions of photon frequency for given densities, bulk electron temperatures, hot electron temperatures, and hot electron fractions. The database was generated using results computed by a non-equilibrium, collisional-radiative atomic kinetics code. Using the two-dimensional RT-PICLS code we have studied the X-ray transport in an ultrafast heated target and the dependence of the emitted K-α radiation on the fast electron dynamics in the solid target. The details of these results obtained from the implementation of the radiation transport model into the PICLS calculations will be reported in this presentation.

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