RADIATION-HYDRODYNAMIC MODELING OF SHORT PULSE HEATED THIN TARGETS[1]

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Fundamental properties of high energy density matter can be studied by heating targets with short laser pulses. Hot electrons, generated by laser interaction with the surface, penetrate and heat thin targets to temperatures of order one keV[2]. Radiation-hydrodynamics modeling provides a means to understand the time dependent plasma evolution and radiation emission from short pulse heated targets, thereby aiding in the design and analysis of experiments. In this presentation we describe LASNEX[3] modeling of the electron transport, coupling of the hot electron energy to the bulk matter, thermal-electron and x-ray transport, and hydrodynamics. We discuss phenomena such as target tamping, radiative collapse, and radial energy transport. We show how simulations of the x-ray emission spectra can be used to infer the plasma conditions established in experiments. We discuss the determination of material properties such as opacity and equation-of-state with short pulse experiments

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[2] D. A. Hoarty, et al. Phys. Rev. Lett. **110**, 265003, 2013, and references therein.
[3] G. B. Zimmerman and W. L. Kruer, Comm. Plasma Phys. Cont. Fusion, 2, **51**, 1975.