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Modeling of a 1-D spherically symmetric experiment on conversion efficiency and thermal transport.[1] M.D. ROSEN, E.L. DEWALD, Lawrence Livermore National Laboratory — Recently experiments were performed at the Omega laser at URLLE by a joint CEA/LLNL experimental team. Spherical targets, 1 mm in diameter, were coated with high Z materials, such as gold and cocktails, and were spherically illuminated at irradiances that varied from 10^{14} W/cm^2 (10 kJ / 3 ns) to 10^{15} W/cm^2 (30 kJ / 1 ns). Conversion efficiency of this laser light to x-rays was measured. Spectral information on the 1 keV thermal x-rays, as well as the multi-keV M-band were obtained. Crucial additional constraints on the modeling were provided by temperature measurements, via Thomson scattering, at 2 different radii in the blow-off, and at various times throughout and after the laser pulse. We compare various modeling tools (e.g. flux limiters, non-local transport models, and a variety of non-LTE atomic physics packages) to all of these well-constrained data. The spherical symmetry allows us to model all of this in 1-D, thus allowing very good zoning to fully resolve the radial variations. In particular, the narrow radial region where the density drops and the temperature rises, and in which most of the conversion to x-rays take place, is well resolved. Implications for how to model NIF ignition hohlraums will also be discussed.

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