Abstract Submitted
for the DPP08 Meeting of
The American Physical Society

Effect of NLTE emissivity models on NIF ignition hohlraum power requirements L. SUTER, S. HANSEN, M. ROSEN, P. SPRINGER, D. CALLAHAN, LLNL — It's well known that the NLTE atomic physics model can significantly affect the power requirements and plasma conditions in ignition hohlraums. This is because the emissivity(Te,ne) is a significant factor in determining the time dependent coronal temperature of the hot blow-off plasma filling ignition hohlraums which, in turn, determines the total energy stored in that coronal plasma at any instant. In this talk we present best estimates of NLTE emissivity using the SCRAM model, including the range of uncertainty, and compare them with the emissivity of the model used to design NIF ignition hohlraums and set the NIF pulse shape. We then present pulse shapes derived from hohlraum simulations using an atomic physics model that approximates the SCRAM emissivities. We discuss the differences in coronal energetics and show how this affects the pulse shape and decreases the peak power requirement. Finally, we present design simulations of potential NIF-commissioning scaling experiments that could distinguish among emissivity models.
Prepared by LLNL under Contract DE-AC52-07NA27344.

L. Suter
LLNL

Date submitted: 16 Jul 2008 Electronic form version 1.4