Abstract Submitted
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Design Parameter Studies of Emission-Based Iron Opacity Measurements[1] MADISON E. MARTIN, Lawrence Livermore National Laboratory and University of Florida, RICHARD A. LONDON, Lawrence Livermore National Laboratory, SEDAT GOLUOGLU, University of Florida, HEATHER D. WHITLEY, Lawrence Livermore National Laboratory — Opacity is a critical parameter in the transport of radiation in systems such as inertial confinement fusion capsules and stars. The resolution of current disagreements between solar models and helioseismological observations would benefit from experimental validation of theoretical opacity models. Short pulse lasers can be used to heat targets to higher temperatures and densities than long pulse lasers and pulsed power machines, thus potentially enabling access to x-ray emission spectra at conditions relevant to solar models. The radiation-hydrodynamic code HYDRA[1] is used to investigate the effects of modifying laser energy, laser pulse length, and target dimensions on the plasma conditions, x-ray emission, and inferred opacity of a buried layer iron target. The accuracy of the opacity inference is sensitive to tamper emission and optical depth effects. An example design that reaches temperatures and densities relevant to the radiative zone of the sun while reducing optical depth and tamper emission effects will be discussed. [1] M. M. Marinak, et. al. Physics of Plasmas 8, 2275 (2001).

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