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Characteristics of warm dense matter produced by a relativistic electron beam¹ THOMAS KWAN, MARK SCHMITT, Los Alamos National Laboratory, MICHAEL BERNINGER, National Security Technologies, LLC — Accurate equation-of-state theory on warm dense matter is a big challenge to model and good experimental data is difficult to obtain. One of the difficulties is the creation of a warm dense matter (WDM) suitable for experiments to examine its equation of state. We have performed calculations using MCNP and LASNEX to examine the warm dense matter created by a highly energetic electron beam such as the DARHT beam at LANL in a cylindrical sample confined by a collar. Energy deposition by the electron beam in the target and collar of different materials were calculated with different beam profiles. The energy deposition was sourced into LASNEX calculations to examine the dynamic evolution of the target and the generation of radially outward propagating shock waves. Our calculations indicated warm dense matter with a temperature of a few electron volts is achievable and the speed of the shock wave can be determined using photonic Doppler velocimetry technique. We will present results from our calculations for various materials of the target and collar and in different geometries.

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Thomas Kwan
Los Alamos National Laboratory

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