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Simulations of DARHT electron-beam heating of thin metal foils for EOS measurements HEIDI MORRIS, Los Alamos Natl Lab, JOSHUA COLEMAN, NICK RAMEY, NELSON HOFFMAN, LANL — The LASNEX 2D Lagrangian radiation-hydrodynamics code is used to simulate the expansion of thin electron-beam-heated foils. The energy is deposited using a particle beam source, which is scaled to model the collisional heating process for an electron beam, but neglects bremsstrahlung. The hydrodynamic expansion and time evolution of quantities dependent on the equation of state for the foil material vary with beam energy and energy density. We present the results of simulations using beams of 4 and 19.8 MeV electron energy and various beam widths (˜1 mm) passing through Cu and Al foils. We assume axisymmetric geometry and solve the Navier-Stokes equations with artificial viscosity and electron thermal conduction, plus multi-group radiation diffusion. Previous simulations performed with Cu, using the SESAME EOS table 3336, showed reasonable agreement with DARHT PDV experimental measurements of the Cu foil expansion [1]. This parameter study will require further experimental validation with the ultimate goal of improving EOS tables for warm dense matter conditions. [1] https://doi.org/10.1103/PhysRevE.98.043201

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