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Investigation of energy partitioning from Leopard short-pulse laser interactions in mass limited targets B. GRIFFIN, H. SAWADA, UNR, T. YABUUCHI, Osaka University, H. MCLEAN, P. PATEL, LLNL, F. BEG, UCSD
— The energy distribution in the interaction of a high-intensity, short-pulse laser with a mass limited target was investigated by simultaneously collecting x-ray and particle data. The Leopard laser system at the Nevada Terawatt Facility delivered 15 J of energy in a 350 fs pulse duration. With a beam spot size limited to within 8μm, the target interaction achieved a peak intensity of 10^{19} W/cm^2 at 20° incidence. The size of the Cu foil targets was varied from 2 -20 μm in thickness and from 50 by 50 μm to 2000 by 2000 μm in surface area. A Bragg crystal x-ray spectrometer and a spherical crystal imager were used to measure 7.5 -9.5 keV x-rays and 8.05 keV monochromatic x-ray images respectively. The escaping electrons and protons in the rear were monitored with a magnet-based electron spectrometer and radiochromic film. Preliminary results show both a decrease of the Kβ/Kα ratio[1] and a stronger Heα emission for smaller sized targets, less than 250 by 250 μm. The detailed analyses of the Kα images and particle data will be presented.

[1]P. Nilson et al., PRE **79,** 016406 (2009).

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