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Study of energy partitioning in mass limited targets using the 50 TW Leopard short-pulse laser[1] BRANDON GRIFFIN, HIROSHI SAWADA, YASUHIKO SENTOKU, University of Nevada Reno, TOSHINORI YABUUCHI, Osaka University, HUI CHEN, J.-B. PARK, HARRY MCCLEAN, PRAV PATEL, Lawrence Livermore National Lab, FARHAT BEG, University of California San Diego — Mass limited Cu targets were used to study the energy distribution in the interaction of an ultra-intense, short-pulse laser by measuring characteristic x-rays and energetic particles. At the Nevada Terawatt Facility, Leopard delivered 15 J to an 8 μm spot size in a 350 fs pulse, achieving a peak intensity of 10^{19} W/cm^2 at 20° incidence. The 2 μm thick Cu foil targets varied in size from 1 mm^2 to 75 μm by 60 μm. A spherical crystal imager and a Bragg crystal x-ray spectrometer were used to measure 8.05 keV monochromatic x-ray images and 7.5-9.5 keV x-rays respectively. A magnet-based electron spectrometer in the rear monitored escaping electrons. Results show a decrease in the absolute yield of both escaped electrons and Cu K-shell x-rays as targets sizes are reduced, while Heα emission remains nearly constant. In the smallest target, a bulk temperature of about 150 eV was inferred from the ratio of Kβ to Kα. The interaction of the Leopard laser with the targets was simulated with 2-D implicit Particle-in-cell code PICLS. Comparisons of the simulation and experiment will be presented.

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