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Experimental and numerical study of fast electron beam characteristics in laser-irradiated thin foil targets using bremsstrahlung emission[1] BRADLEY WESTOVER, University of California San Diego, CLIFF CHEN, PRAV PATEL, MICHAEL KEY, HARRY MCLEAN, Lawrence Livermore National Laboratory, FARHAT BEG, University of California San Diego — Laser to fast electron conversion efficiency and hot electron temperature are two important parameters for fast ignition ICF. Experiments are reported where bremsstrahlung emission data from short-pulse laser-irradiated foils was collected with high-energy x-ray spectrometers at multiple angles. These instruments show that bremsstrahlung emission is consistent with an electron beam in the target with a 60 degree half-width divergence angle and a conversion efficiency of 30-35% using the Monte Carlo code ITS. In addition, multiple electron distributions, including the electron distributions predicted by particle-in-cell codes, were modeled in the electron transport code ZUMA, and their bremsstrahlung emission predictions tested against the experimental data. Resistivity and electromagnetic fields were taken into account in the ZUMA calculations, allowing the experimental data to constrain the electron source distribution with greater accuracy.

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