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Hybrid-PIC modeling of high energy x-ray generation by laser-accelerated fast electrons[1] TYLER DAYKIN, HIROSHI SAWADA, BRUNO BAUER, University of Nevada Reno, FARHAT BEG, University of California San Diego — High energy x-rays, produced by laser-accelerated fast electrons, are a bright flash source that has been applied in high energy density physics experiments such as Compton and K-alpha radiography of an ICF core. Of particular interest to probe a cylindrically compressed 1 mm diameter solid Al rod, x-ray energies in the range of 20-30 keV are required. A 2-D hybrid particle-in-cell (PIC) code, LSP, was used to model the generation of high energy bremsstrahlung and characteristic K-alpha x-rays by injecting fast electrons. As a first step, the fast electron transport and x-ray generation in the code were benchmarked against a Monte Carlo calculation. This was done by injecting a mono-energetic 1 MeV beam of electrons into a 100 um thick Cu foil, and comparing the angularly resolved bremsstrahlung spectra that each code outputs. The benchmarked LSP code was applied to simulating fast electron propagation with self-consistent fields and bremsstrahlung generation in various shapes of metal targets. These targets include copper wire, and foils, with various diameters and thicknesses in order to study the refluxing of fast electrons. The results of the simulations will be presented at the conference.

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