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Characterization of The Laser-Induced Fast Electron Scattering[1]
SHENG JIANG, ANDREW KRYGIER, The Ohio State University, ANTHONY LINK, Lawrence Livermore National Laboratory, RICHARD FREEMAN, The Ohio State University — Imaging the electron-stimulated K_α fluorescence is a canonical way to measure the divergence of fast electrons.[2] However, the scattering effect often enlarges the measured X-ray spot diameter. We are attempting to determine the role of fast electron scattering in X-ray imaging by performing the Monte-Carlo (MCNP) simulations. An injection source based on the prescription of Debayle et al.[3] is employed to launch the electrons into the target. The subsequent density of both X-ray production and electron energy deposition versus transverse distance is calculated at various depths. The electron spatial distribution can show substantial differences with and without scattering, leading us to infer that other analyses that do not include fast electron scattering could be misleading. The amount of angular divergence induced by scattering of electrons from different sources is estimated according to MCNP results.

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[2]R. B. Stephens *et al.*, Phys. Rev. E 69, 066414
[3]A. Debayle *et al.*, Phys. Rev. E 82, 036405

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