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Lateral Propagation of MeV Electrons Generated by Femtosecond Laser Irradiation JOHN SEELY, Naval Research Laboratory, CSILLA SZABO, PATRICK AUDEBERT, ERIK BRAMBRINK, EMERIC TABAKHOFF, LAWRENCE HUDSON — Using high-resolution hard x-ray spectroscopy, the propagation of MeV electrons generated by intense ($\approx 10^{19}$ W/cm^2) femtosecond laser irradiation, in the lateral direction perpendicular to the incident laser beam, was studied using targets consisting of irradiated metal wires and neighboring spectator wires embedded in electrically conductive (aluminum) or resistive (teflon) substrates. It was found that electron propagation through teflon was inhibited, compared to aluminum, implying a relatively weak return current and incomplete space-charge neutralization. The energetic electron propagation in the direction parallel to the electric field of the laser beam was larger than perpendicular to the electric field. Such lateral electron propagation to distance up to 1 mm from the focal spot can be detrimental to fast-ignition fusion and hard x-ray backlighter radiography.

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