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Simulations of Electron-Beam Transport in Solid-Density Targets and the Role of Magnetic Collimation A.A. SOLODOV, M. STORM, J.F. MYATT, R. BETTI, D.D. MEYERHOFER, P.M. NILSON, W. THEOBALD, C. STOECKL, Laboratory for Laser Energetics and FSC, U. of Rochester — Three-dimensional simulations of solid-target electron-transport experiments at the Laboratory for Laser Energetics have been performed, using the hybrid-PIC code *LSP*. The experimentally observed fast-electron divergence half-angle of 16° in the target was reproduced assuming an initial divergence half-angle of ∼56°, close to the value expected from the simple ponderomotive acceleration formula: $\theta_{1/2} = \tan^{-1}\left[\sqrt{2/(\gamma-1)}\right]$, where γ is the electron relativistic factor. The simulations accurately reproduce the details of the electron transport observed in the experiment. The electron beam propagates as an expanding annulus that breaks into filaments because of the resistive filamentation instability. The electron-beam partial collimation and annular propagation is due to the resistive azimuthal magnetic field generated at the outer edge of the electron beam. Features of the electron-beam transport through the cone tip of fast-ignition cone-in-shell targets will also be discussed. This work was supported by the U.S. Department of Energy under Cooperative Agreement Nos. DE-FC02-04ER54789 and DE-FC52-08NA28302.

A.A. Solodov
Laboratory for Laser Energetics and FSC, U. of Rochester

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