SIMULATIONS OF ELECTRON TRANSPORT FOR FAST IGNITION USING LSP*

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A crucial issue for the viability of the fast ignition approach [1] to inertial fusion energy is the transport of the ignition pulse energy from the critical surface to the high-density compressed fuel. Experiments have characterized this transport through the interaction of short pulse, high intensity lasers with solid-density targets containing thin K_α fluorescence layers [2]. These experiments show a reasonably well-collimated beam, although with a significantly larger radius than the incident laser beam. We have previously reported LSP calculations that showed reasonable agreement with these experiments, but used an ad-hoc prescription for the fast electron source. We are coupling the particle distribution from Z3 (a massively parallel explicit 3D PIC code based on Zohar [3]) to our LSP calculations. The LSP code uses a direct implicit particle-in-cell (PIC) algorithm in 2 or 3 dimensions to solve for beam particle transport, while treating the background particles as a fluid [4]. The implications for fast ignition will be discussed.

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