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Transport of Huge Currents of Charged Particles for Fast Ignition Applications RICHARD R. FREEMAN, The Ohio State University — The Fast Ignition concept depends upon delivering enough energy to a compressed core of D-T for ignition from a psec-duration laser pulse. Even assuming that one has a peta-Watt class laser of sufficient energy, there is the problem that the laser pulse cannot penetrate the dense plasma surrounding the compressed core. That is, the light from the laser is stopped, with some, 30% of the laser energy converted into fast electrons, at the relativistic critical density. From there, in order for these electrons to travel to the dense core and deposit their energy, they must travel through 4 orders of increasing density in a few tens of microns, while remaining tightly collimated. Recent experimental and theoretical work has demonstrated that the physics surrounding this propagation is both complex and surprisingly frustrating. In turns out that the experiments show that there are many anomalous stopping mechanisms that hinder this transport, and that the computer modeling for realistic targets is quite difficult. This talk outlines the difficulties, advances, and "work-arounds" that have been identified in the last several years.

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