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OSIRIS Modeling of High Energy Electron Transport in Warm Dense Matter[1] J MAY, UCLA, T YABUUCHI, C MCGUFFEY, MS WEI, F BEG, UCSD, WB MORI, UCLA — In experiments on the Omega EP laser, a high intensity laser beam ($eA/m_e c > 1$) is focused onto a gold foil, generating relativistic electrons. Behind the Au foil is a layer of plastic foam through which the electrons are allowed to transport, and on the far side of the CH from the gold is a copper foil; electron fluence is measured by recording the k-α from that foil. The foam layer is either pre-ionized via a shock launched from an ablator irradiated earlier with a beam perpendicular to the high intensity beam; or the foam is in the solid state when the high intensity beam is switched on. In the latter case the foam – which has an initial density of $200mg/cm^3$ – heats to a temperature of 40eV and rarifies to a density of $30mg/cm^3$. Results show an order of magnitude decrease in k-α when the CH layer is pre-ionized compared to cold CH. OSIRIS simulations indicate that the primary explanation for the difference in transport seen in the experiment is the partial resistive collimation of the beam in the higher density material, caused by collisional resistivity. The effect seems to be mostly caused by the higher density itself, with temperature having minimal effect.

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