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First quantitative measurements of charged-particle stopping and its dependence on electron temperature and density in Inertial-Confinement-Fusion plasmas J. FRENJE, C.K. LI, F. SÉGUIN, A. ZYLSTRA, H. RINDERKNECHT, R. PETRASSO, MIT, J. DELETTREZ, V. GLEBOV, T. SANGSTER, LLE — We report on the first quantitative measurements of charged-particle stopping in Inertial-Confinement-Fusion (ICF) plasmas at various conditions. In these experiments, four charged fusion products from the DD and D^3He reactions in D^3He gas-filled filled implosions were used to determine the stopping power of ICF plasmas at electron temperatures (T_e), ion temperatures (T_i), and areal densities (ρR) in the range of 0.6-4.0 keV, 3-14 keV and 2-10 mg/cm^2, respectively. The resulting data, in the form of measured energy downshift of the charged fusion products, clearly indicate that the stopping-power function depends strongly on T_e. It was also observed that the stopping-power function change in characteristics for higher-density implosions in which ions and electrons equilibrate faster, resulting in higher T_e relative to T_i and higher ρRs. These results will be modelled by Landau-Spitzer theory and contrasted to different stopping-power models. This work was partially supported by the US DOE, NLUF, LLE, and GA.

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