The Effect of Cross-Beam Energy Transfer on Two-Plasmon Decay in Direct-Drive Implosions

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The reduced CBET leads to higher intensity at the quarter-critical density surface, increasing the hot-electron production by a factor of $\sim 7$. Adding a thin layer (0.6 to 1.1 $\mu$m) of Si to the target ablator reduced the hot-electron fraction by a factor of $\sim 2$. Spatially resolved Thomson-scattering measurements show an $\sim 15\%$ increase in the electron temperature and an increase in the Si fraction at the quarter-critical surface when the Si layer is added. Three-dimensional laser–plasma interaction simulations of hot-electron production using the code \textit{LPSE} show that in addition to the reduced gain (smaller $IL_{n_i}/T_e$), the observed reduction in hot electrons results from increased electron–ion collision frequencies and reduced Landau damping of ion-acoustic waves.\textsuperscript{2}

This material is based upon work supported by the Department of Energy National Nuclear Security Administration under Award Number DE-NA0001944.

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Date submitted: 13 Jul 2016

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