Supersonic Propagation of a K-Shell Ionization Front in Metal Targets


The supersonic propagation of a K-shell ionization front has been measured in high-energy-density metal targets using 1-D monochromatic streaked x-ray imaging. The ionization front was driven by hot electrons generated by a 10-ps laser pulse focused to an intensity of $10^{18}$ W/cm$^2$. The data show the ionization front travelling at $0.11c \pm 0.02c$. The measurements are in good agreement with implicit-hybrid particle-in-cell and collisional-radiative code calculations that predict the hot-electron transport and the K-shell ionization front dynamics. 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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