Inverse Bremsstrahlung Absorption

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Inverse bremsstrahlung absorption was measured based on transmission through a finite-length plasma that was thoroughly characterized using spatially resolved Thomson scattering. Expected absorption was then calculated using the diagnosed plasma conditions while varying the absorption model components. To match data, it is necessary to account for: (i) the Langdon effect; (ii) laser-frequency (rather than plasma-frequency) dependence in the Coulomb logarithm, as is typical of bremsstrahlung theories but not transport theories; and (iii) a correction due to ion screening [1]. Radiation-hydrodynamic simulations of inertial confinement fusion implosions have to date used a Coulomb logarithm from the transport literature and no screening correction. We anticipate that updating the model for collisional absorption will substantially revise our understanding of laser-target coupling for such implosions.

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