

HTPD 2018



Contribution ID : 247

Type : not specified

8.3 OMEGA Supersonic Gas-Jet Plasma Characterization with Thomson Scattering

Tuesday, 17 April 2018 16:00 (120)

A supersonic gas-jet target platform has been activated on the OMEGA laser. The plasma formed using a gas-jet target and ~3 kJ of UV energy from the OMEGA Laser System was characterized using 2ω Thomson scattering. Thomson scattering provided accurate time-resolved measurements of plasma conditions including electron density, plasma temperature, and ionization state. Plasma conditions include electron temperatures in the 0.5-keV to 1-keV range and electron densities between $1 \times 10^{19} \text{cm}^{-3}$ and $9 \times 10^{19} \text{cm}^{-3}$ in a nitrogen plasma. The measurements made using Thomson scattering are then compared with the results of the radiation-hydrodynamics code HYDRA. These initial measurements demonstrate the capabilities of the OMEGA gas-jet as a platform for future laser-plasma interaction science. 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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Session Classification : Session #8, Tuesday Afternoon Poster Session