Contribution ID: **9** Type: **Contributed poster**

Time Dynamics and Spectral Resolved Emission Imaging of Colliding Laser Produced Aluminum Plasma

Monday, 25 June 2018 18:00 (15 minutes)

Time Dynamics and Spectral Resolved Emission Imaging of Colliding Laser Produced Aluminum Plasma
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Abstract
Colliding laser produced plasma have been investigated in a wide range of laser irradiance regimes (1010- 1015 W/cm2) and for several purposes: by employing them as possible fuels for ICF-inertial fusion confinement or in order to reproduce, on a laboratory-scale, astronomical processes as for example collision-less shock eaves production [1,2].
In the present work, the collision of two aluminum plasmas was investigated by combining both time and space resolved spectroscopy.
Plasma plumes were produced by a ContinuumTM Surelite Nd:YAG laser system with pulse duration of FWHM of 6 ns and wavelength of 1064nm, at a laser irradiance of ~1011 W/cm3 on slab Al target.
By using Filter sensitive technique, the temporally and spatially resolved electron density and temperature at the stagnation layer were present, with a time resolution of 10ns.
The data analysis confirms that the electron density of the stagnation layer evolves over a longer timescale than in the single plume case.

References:
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[2] N.C. Woolsey, C. Courtois, R.O. Dendy, Plasma Physics and Controlled Fusion 46 (2004) B397.

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Session Classification: Poster session