

Diagnostics of a laser-produced plasma with high density-gradient using a double-grating differential interferometer

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We used a high peak power of 1 TW to tightly focus the laser beam onto a gas jet with a nozzle orifice size of 100 μm . Due to the tightly-focused laser pulse, a high density-gradient plasma is generated, which is not easy to measure accurately. For this purpose, we developed a new differential interferometry method using a pair of gratings. It was found that our method can mitigate the detrimental impact of all kinds of noises arising from phase measurement, recovery, unwrapping, and Abel inversion processes. As a result, this technique showed enhanced precision and better reliability in plasma density diagnostics, compared with other conventional interferometry methods. In this presentation, we will show the comparison results.

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