Contribution ID : **17** Type : **not specified**

10.2 Time-Resolved X-Ray Diagnosis Of Hydrodynamic Processes Of Radiation-Ablated Gold Plasma In An Elongated Diagnostic Hole

Wednesday, 18 April 2018 10:30 (90)

Diagnostic hole used in indirect-drive inertial confinement fusion cannot be too large to cause severe radiation loss and affect the radiation uniformity in the hohlraum, or too small in case the plasma filling would block diagnostic holes and affect the diagnosis. An elongated hole is chosen as an extreme case to study the plasma movement in diagnostic hole in order to provide reference for the diagnostic hole design. The elongated diagnostic hole on the gold hohlraum wall was 150 μm in diameter and 100 μm deep. The peak radiation temperature of hohlraum was about 180 eV. The hydrodynamic processes in the elongated hole was observed by an X-ray framing camera. Laser-irradiated Ti disk was used to generate 2-5 keV narrow energy X-ray as the intense backlighter source. The plasma areal density distribution and evolution in the elongated hole was quantitatively measured and can be used to assess the effect of hydrodynamic processes on the diagnosis from the diagnostic hole.

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Session Classification : Session #10, Wednesday Morning Poster Session