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Laser-produced Plasmas X-ray Source and Its Application to Rayleigh Taylor Instability Study RUIRONG WANG, WEI WANG, JIAQIN DONG, Shanghai Institute of Laser Plasma — Several experiments have been performed on the SG-II laser facility to understand x-ray source and to test radiography concepts. Through the use of a novel time-integrated, space and energy-resolved x-ray spectrometer and pinhole camera, potential Helium-like Titanium K alpha x-ray backlighting (radiography) line source is studied as a function of laser wavelength, the pre-pulse to main pulse intensity contrast, and the laser intensities. One-dimensional radiography using a grid consisting of 5μm Au wires on 16-μm period and the pinhole-assisted point projection were tested. The measurements show that the relative x-ray line emission conversion efficiency from the incident laser light energy to Helium-like Titanium K-shell spectrum increases significantly with pre-pulse intensity, increases rapidly with decreasing laser wavelength, and increases moderately with increasing main laser intensity. It is also further demonstrated that the level of the pinhole-assisted point projection will be a novel and simple two-dimensional imaging diagnostic technique for inertial confinement fusion experiments.

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