

Abstract Submitted
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Characteristics of soft x-ray emissions from Au plasmas generated with various driving laser pulse durations¹ YASUHIRO MATSUMOTO, CHRISTIAN JOHN, TAKEHIRO MORISHITA, Hiroshima university, MAKI KISHIMOTO, QST, SHINICHI NAMBA, Hiroshima University, HIROSHIMA UNIVERSITY TEAM, QST COLLABORATION — X-ray microscope using water window X-rays (2.3-4.4 nm) emitted from laser plasmas enables us to observe nanoscale structures of living cells. For higher spatial resolution without blurring, we need bright X-ray source with a pulse duration of less than a few nanosecond. As a promising X-ray source, we have focused on laser produced gold plasmas that emit continuum radiation in water-window wavelengths. In this study, by using Nd-YAG laser systems (1064 nm) with pulse durations of 7 ns, 400 ps and 10 ps, characteristics of the laser plasmas were investigated. The target with a thickness of 0.3 mm was irradiated by the laser beams focused using a convex lens (100 mm). For spatial resolved X-ray measurement, a grazing incidence spectrometer (flat field grating, 2400 grooves/mm) with a toroidal mirror was used. A pinhole camera with an aperture of 10 μm observed 2D plasma emission image. Two photodetectors were installed to measure the X-ray pulse duration and its energy with respect to the laser incident angle. Compared with these measurements, dependence of the plasma properties on laser pulse duration was examined. We also evaluated the conversion efficiency from laser to water-window X-rays.

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Yasuhiro Matsumoto
Hiroshima University

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