



1. Title:	Axial Dynamics of Z-pinch Plasmas Driven by 100 ns-long Current Pulses
2. Full names of all authors:	Sunao Katsuki, Hidenori Akiyama, Takashi Sakugawa, Takao Namihira, Hideki Imamura, Nobufumi Tomimaru

3. Abstract body:

EUV emission of xenon Z-pinch plasmas driven by 100 ns long current pulses have been investigated on the basis of plasma dynamics in the axial direction. The discharge chamber consists of an alumina ceramic ring with an inner diameter of 5 mm sandwiched by a hollow cathode and a ring anode. Time-resolved visible and EUV cameras with temporal resolution of 5 ns were placed in the direction of 30 degrees based on the Z axis, which enables to observe the axial dynamics of the plasma and the EUV emission. Both X-ray and in-band EUV emissions were monitored by using filtered fast photodiodes. With a small xenon flow rate less than 50 cc/min, X-ray emission occurs in the increasing phase of the current pulse, where no EUV emission is observed. The EUV emission mainly occurs in the decay phase of the current. Intensity of the X-ray emission decreases with increasing the xenon flow rate. The time-resolved visible imaging shows the plasma motion is dynamic not only in the radial direction but also in the axial direction. The time-resolved EUV imaging shows the EUV emission region moves by several mm toward the vacuum side, which results in lengthening the source size. The plasma motion needs to be suppressed to make the source small.

This work was supported by NEDO and EUVA, and was a part of the 21 Century COE program administrated by MEXT.