

Abstract Submitted
for the DPP09 Meeting of
The American Physical Society

Spatially-Resolved Spectroscopic Study of Arcjet Helium Plasmas Expanding through a Rectangular-Shaped Converging-Diverging Nozzle SHINICHI NAMBA, NORIYASU YASHIO, KAZUKI KOZUE, KEISUKE NAKAMURA, TAKUMA ENDO, KEN TAKIYAMA, Hiroshima University, KUNINORI SATO, National Institute for Fusion Science — An arcjet discharge device with a rectangular-shaped converging and diverging nozzle has been developed, which allowed us to optically observe high density plasmas inside the anode nozzle. Spectroscopic observation along the plasma expansion axis was carried out to examine the characteristics of plasma parameters inside the nozzle. Analyzing the intense continuum and line emission spectra, we successfully obtained the spatial variations of electron temperature and density. Moreover, it was found that two dimensional optical measurement was of great use in visualizing the transition from the atmospheric thermal plasma to strong non-equilibrium recombining phase due to an adiabatic expansion.

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Date submitted: 21 Jul 2009

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