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Laser Induced Fluorescence Measurement of Plasma Hole in a Helium Plasma with Argon Impurity[1] SHINJI YOSHIMURA, NIFS, ATSUSHI OKAMOTO, Tohoku Univ., MASAYOSHI TANAKA, Kyushu Univ. — A singular vortex with density cavity in its center (plasma hole) has been observed in a magnetized helium plasma. The ion flow velocity field of the plasma hole measured with a directional Langmuir probe shows a monopole vortex with radial flow. In order to measure more precise ion flow velocity field, we have developed a laser induced fluorescence (LIF) Doppler spectroscopy system for the Hyper-I device at the National Institute for Fusion Science, Japan. Since a suitable LIF scheme at visible wavelength is available for argon ions, we employed it to determine the flow velocity field of the plasma hole in a helium plasma in which a small amount of argon gas is introduced as an impurity. An ArII metastable state is excited by a tunable dye laser operating at 611.5nm and the fluorescence decay at 461.0nm is observed by a photomultiplier tube with an optical filter. By sweeping the wavelength of the dye laser, we can obtain information about the Doppler-shifted velocity distribution function of the excited ions. By changing the path of laser beam and the position of collection optics, we can obtain both azimuthal and radial ion flow velocities.

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