

Abstract Submitted  
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**Estimation of homogeneous linewidth of the argon  $4s[3/2]_2^o - 4p[3/2]_2$  transition by saturation spectroscopy** S. NISHIYAMA, Hokkaid University, M. GOTO, National Institute for Fusion Science, K. SASAKI, Hokkaid University — We are developing a Stark spectroscopy system, on the basis of saturation spectroscopy, to measure electric field in argon-containing plasma. Saturation spectroscopy achieves a Doppler-free spectral resolution and a high frequency resolution of the saturation spectrum is required to realize sensitive Stark spectroscopy. In this work, we have investigated the linewidth of the saturation spectrum of the argon  $4s[3/2]_2^o - 4p[3/2]_2$  absorption line at various saturation parameters. The plasma source in the experimental apparatus was an inductively-coupled plasma source. The light source was a tunable cw diode laser, and the frequency of the laser was scanned over the Doppler width around the  $4s[3/2]_2^o - 4p[3/2]_2$  absorption line (763.51 nm). A small fraction of the laser beam was picked up for a weak probe beam, and the remaining intense beam was used for a pump beam. Homogeneous linewidth without the saturation broadening estimated from the linewidth of the saturation spectrum and the saturation parameter was approximately 10 MHz, while the natural linewidth of this line is 5.5 MHz. Collisional broadening and the instability of the laser frequency are possible reasons of this difference.

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