

§8. 1 m UV Visible Spectrometer System for LHD

Kobuchi, T. (The Grad. Univ. for Advanced Studies),
Komada, S., Kojima, M., Sato, K.

For spectroscopic measurements of LHD plasma, we have installed the 1m UV Visible spectrometer system which covers 200 - 700 nm wavelength region. PDA (Photo Diode Array) with 1024 pixels enables us to measure the wavelength coverage of 8 nm in each shot with time resolution of 30 msec. This spectrometer will be used to study light impurity behaviors in plasma and Doppler ion temperature measurement.

A high spectral resolution of 0.01nm at 4th or 5th order spectra is achieved by the use of the grating blazed at 1000nm. Unresolved spectra at 1st order will be able to separate at higher order. The spectra(313.15, 313.18 nm) of mercury lump is shown in Fig. 1.

For the data acquisition, CAMAC system which is issued by LABCOM Group, is applied. The control program of CAMAC system have been developed to handle the 16 bit x 1024 data and control the detector system with PDA. This program have been used for the test or calibration of the system. At present, this program allows eight frames data acquisition in one shot. The wavelength driver of spectrometer is controlled by VME through GPIB.

1m UV Visible spectrometer have been installed in the end of vacuum pumping manifold of 6-O port, then the plasma center is about 14m distance from the spectrometer (see Fig. 2). The line-of-sight of the spectrometer is set to the center of plasma.

Assignment of spectra of impurity ions has been started in LHD experiments. As an example, $3s\ 3S - 3p\ 3P$ (278.104, 278.703, 278.986 nm) spectra of OV triplet system of ECH plasma in LHD is shown in Fig. 3.

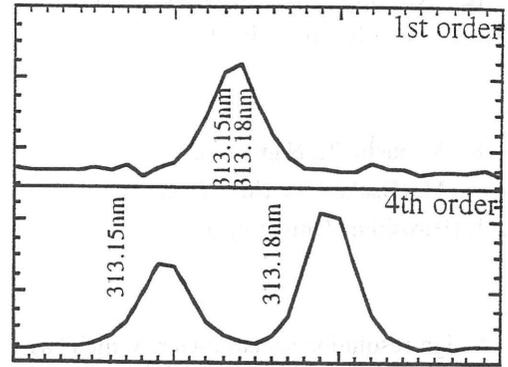


Fig. 1. Comparison of the first and 4th order spectra of mercury lump.

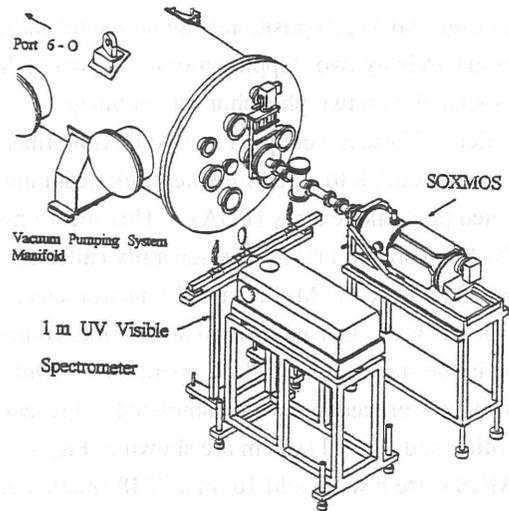


Fig. 2. Setup of 1m UV Visible spectrometer in the end of vacuum pumping manifold of 6-O port.

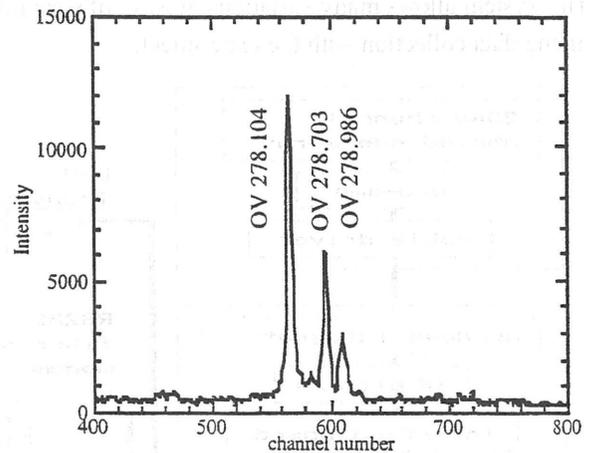


Fig. 3. $3s\ 3S - 3p\ 3P$ spectra of OV triplet system.