

## §20. Thomson Scattering System

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The Thomson scattering system installed on the JIPPT-IIU tokamak can give electron temperature  $T_e$  and density  $n_e$  at 28 points along a vertical line with the repetition rate of 100 Hz. Though it has operated almost routinely, it lacks the long term stability in its performance: as time passes after a calibration, the  $T_e$  and  $n_e$  profiles show up some irregularities. This is caused by the combined facts that the laser beam position gradually shift and that the sensitivity of each light detector in the polychromator has different dependence on the laser beam position as shown in Fig.1. In the above case, the shift of laser beam as small as 0.3 mm introduces the errors in  $T_e$  as large as 10%. A refined alignment of each detector position improved the situation appreciably. The difference in the laser beam position at the calibration and at the scattering also introduces some systematic error. To counter this, laser beam positioning was done by using the plasma as a target: the laser beam is scanned transversely during plasma discharge and then fixed at the position where maximum signals are obtained. An example is shown in Fig.2. This alignment procedure at the beginning of every week run eliminate the systematic error satisfactory. An example of the reduced data is shown in Fig.3.

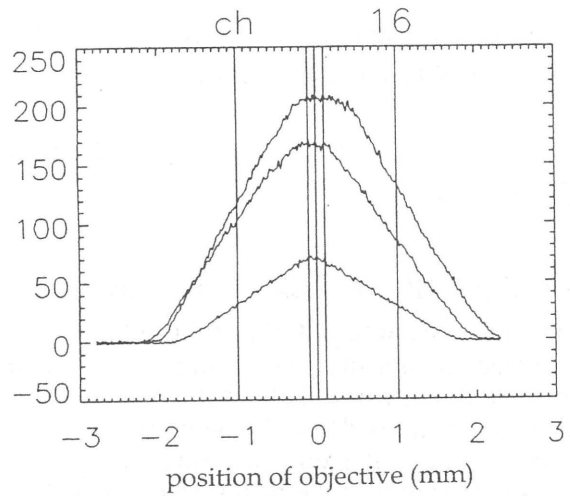


Fig.1. Sensitivities of three detectors in a polychromator as a function of laser beam position.

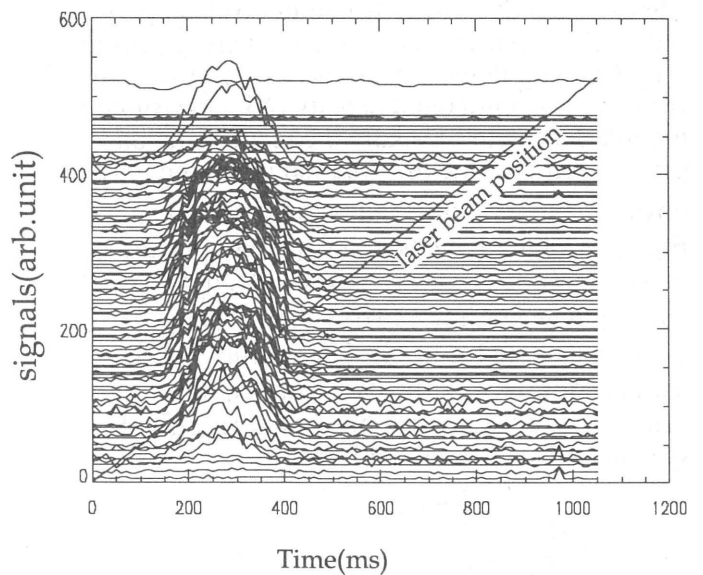


Fig.2. The raw scattering signals when the laser beam position is swept.

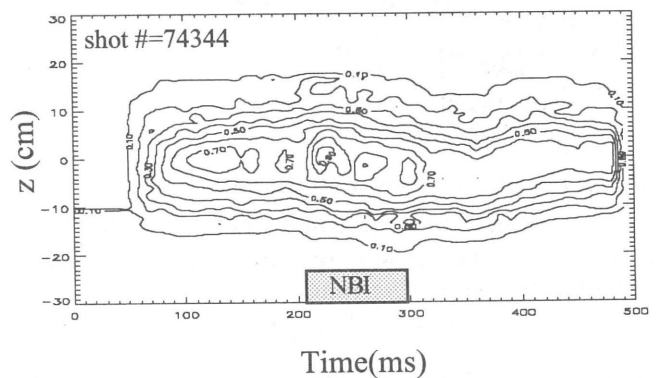


Fig.3. An example of contour plot of  $T_e$ .