

**Charge Exchange Recombination Spectroscopy on NSTX**

R.E. Bell, D.W. Johnson, R. Feder

*PPPL*

T. M. Biewer

*PSFC, MIT*

A high throughput, high spatial resolution charge exchange recombination spectroscopy diagnostic is operating on the National Spherical Torus Experiment. Two f/1.8 fixed-wavelength transmission grating spectrometers are coupled to thinned back-illuminated CCD detectors. Emission from C VI 5291 Å is measured along 51 sightlines viewing three neutral beam (NB) sources with 0.5-3 cm resolution from edge to core every 10 ms. 39 sightlines not viewing the neutral beams measure background emission. Spatial and absolute photometric calibrations are conducted in vessel. Wavelength and instrumental function calibrations are performed using a neon glow. The data analysis consists of fitting and modeling the background emission, fitting the active view, a beam attenuation calculation, Zeeman correction, computation of the effective charge exchange cross section, and correcting for the effects of the energy dependent charge exchange cross section on ion temperature and velocity. Fully automated data acquisition and analysis codes provide between-shot availability of fully corrected profiles of Ti, V $\phi$ , Nc, and Zeff.

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