

Abstract Submitted  
for the DPP12 Meeting of  
The American Physical Society

**Utilization of passive emission contributing to charge exchange spectra in NSTX**<sup>1</sup> R.E. BELL, A. DIALLO, B.P. LEBLANC, M. PODESTA, F. SCOTTI, Princeton Plasma Physics Laboratory — The passive emission of  $C^{5+}$  ions from independent views is routinely measured on NSTX to subtract the passive contribution from active views across the neutrals beams used for charge exchange recombination spectroscopy. The passive emission can provide further useful information in the region of the  $C^{5+}$  emitting shell near the plasma edge. Inversion of the fitted spectrum of the line-integrated  $C^{5+}$  brightness from the passive views yields profiles of local ion temperature, velocity, and emissivity. Using rate coefficients for electron excitation, recombination, and thermal charge exchange, the relative contributions to the  $C^{5+}$  emission and the  $C^{5+}$  density profile could be uniquely determined if the local neutral deuterium density were known. Using the radial force balance equation and both active and passive measurements, the profile shape of the  $C^{5+}$  density can be determined. In turn, the amplitude of the  $C^{5+}$  density can be related to the neutral deuterium density profile, thereby establishing a range for the neutral deuterium density near the plasma edge. Independent information on the ratio of the  $C^{5+}/C^{6+}$  densities, from an impurity transport code or possibly from the  $C^{5+}$  emissivity profile shape, can improve the accuracy of the inferred neutral deuterium profile.

<sup>1</sup>Work supported by U.S. DOE Contract No. DE-AC02-09CH11466

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Date submitted: 24 Jul 2012

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