

Abstract Submitted
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Measurement of poloidal velocity on NSTX¹ R.E. BELL, R. FEDER, Princeton Plasma Physics Laboratory — A spectroscopic diagnostic to measure impurity ion poloidal velocity profiles using charge exchange recombination spectroscopy has been installed on NSTX. Up-down symmetric viewing chords in the plane of the neutral beam are matched with similar symmetric views off the neutral beam to measure both active and background emission. Eight fast (f/1.8-f/2) camera lenses at four locations make up the collection optics. Six f/1.8 spectrometers measure 276 spectra of C VI ions every 10 ms to obtain 75 active spatial channels and 63 background channels to achieve a spatial resolution of 0.7-1.7 cm after inversion. Inversions are necessary to obtain local values from the chord-averaged measurements. The background emission is fitted and inverted for subtraction from active views. Non-vertical symmetric views and independent toroidal velocity measurements allow the separation of the vertical and horizontal components of velocity induced by the energy-dependent charge-exchange cross section and ion gyromotion, which should eliminate the need for knowledge of atomic physics cross sections, halo neutral densities, level mixing, and excited beam populations when extracting the poloidal velocity.

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