

Abstract Submitted
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Measurements of ion and electron temperature profiles on NSTX with an X-ray imaging crystal spectrometer¹ M. BITTER, C. BUSH, K.W. HILL, L. ROQUEMORE, B. STRATTON, D. MASTROVITO, Princeton Univ., P. BEIERSDORFER, LLNL, M.F. GU, Stanford Univ. — The prototype of a new X-ray imaging crystal spectrometer has been installed on NSTX to measure profiles of the ion and electron temperatures from spatially resolved dielectronic satellite spectra of ArXVII in the wavelength range from 3.9 to 4.0 Å [1]. The spectrometer consists of a spherically bent 110-quartz crystal, with a radius of curvature of 389 cm and a diameter of 10 cm, and a 10 cm x 30 cm, two-dimensional, position-sensitive, multi-wire proportional counter. It projects an image of a large area of the plasma with an extension of +/- 40 cm below and above the horizontal mid-plane of NSTX onto the detector with a demagnification of 2.5. The resolution in the plasma is solely determined by the Bragg angle, the height of the crystal and its distance from the plasma; and it is about 3 cm, if the crystal is fully opened. The concept of this new spectrometer is also of interest for ion temperature measurements on ITER [2]. The paper will present results from profile measurements of the ion and electron temperature from NSTX discharges with pure ohmic heating as well as RF and neutral-beam heating. [1] M. Bitter et al., Rev. Sci. Instrum.75, 3660 (2004); [2] R. Barnsley et al., Rev. Sci. Instrum.75, 3743 (2004).

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