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Prototype high resolution multi-energy soft X-ray array for NSTX[1] K. TRITZ, D. STUTMAN, L. DELGADO-APARICIO, M. FINKENTHAL, Johns Hopkins University, R. KAITA, L. ROQUEMORE, PPPL — Our previous work has shown the utility of multi-energy filtered SXR data for the fast measurement of electron temperature and impurity profiles in NSTX. A novel diagnostic design with an improved spatial resolution of $<$ 1cm and an increased set of multi-energy SXR profiles allows continuous, fast (1-10kHz) measurements of both T_e and impurity profiles ranging from the plasma core into the steep gradient region of the pedestal. With this, 4-6 filtered SXR profiles as well as an unfiltered bolometric profile will extend the temperature measurement to lower T_e. A single energy prototype system has been implemented on NSTX which is comprised of a filtered X-ray pinhole camera which converts the X-rays to visible light using a CsI:Tl phosphor. The phosphor is mounted on an image intensifier coupled to a high-speed CMOS camera using a fiber optic image bundle. Low noise SXR profiles have been measured in high beta H-mode plasmas at frame rates up to 10kHz. Comparisons to the existing, toroidally displaced tangential multi-energy SXR array will be also presented, aimed at measurements of non-axisymmetric perturbations.

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