

Abstract Submitted
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Application of a PILATUS II Detector to an X-Ray Imaging Crystal Spectrometer for fast Measurement of Ti and Rotation-Velocity Profiles on Alcator C-Mod¹ K.W. HILL, M.L. BITTER, S.D. SCOTT, Princeton U., A. INCE-CUSHMAN, J.E. RICE, MIT, S.G. LEE, KBSI, C. BROENNIMANN, E.F. EIKENBERRY, PSI — A high resolution imaging x-ray crystal spectrometer (XICS) is being developed for Doppler measurement of radial profiles of ion temperature, T_i , and rotation velocity on Alcator C-mod. The XICS consists of a spherically bent crystal and a 2D imaging x-ray detector, and provides x-ray spectra from highly charged ions from multiple plasma sightlines. The proof of principle of the XICS was demonstrated by measurement of Ar XVII $K\alpha$ spectral images from +/- 8 cm of the plasma height in Alcator C-Mod and +/- 40 cm in NSTX. However, the time resolution was limited to values >100 ms by the ~400 kHz global count-rate limit of the available 2D gas detector. A silicon pixel array detector, PILATUS II, with a count-rate capability of 1 MHz PER PIXEL, was tested on C-Mod by recording spectra of ArXVII at 3.1 keV, and should enable XICS time resolution < 10 ms. The detector test results and C-Mod XICS design and expected performance will be presented.

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