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An advanced X-ray imaging crystal spectrometer for tokamak plasmas SANG GON LEE, JUN KYO BAK, MIN GAP BOG, National Fusion Research Center, UK WON NAM, Korea Astronomy & Space Science Institute, MYUNG KOOK MOON, JONG KYU CHEON, Korea Atomic Energy Research Institute — An advanced X-ray imaging crystal spectrometer (XICS) utilizing a segmented position-sensitive two dimensional (2D) multi-wire proportional counter and time-to-digital converter (TDC) based delay-line readout data acquisition system is under development. The XICS provides spatially and temporally resolved measurements of the ion and electron temperatures, toroidal rotation velocity, impurity charge-state distributions, and ionization equilibrium. Recently, a proto-type of two-segmented detector with a F1 chip TDC based delay-line readout and supporting electronics successfully demonstrated to improve the photon count-rate capability of the XICS system. Based on this improvement, further developments including four- and eight-segment detectors and supporting electronics are possible. Furthermore, a vacuum brazing technique for a small thin beryllium window has been successfully developed. This vacuum brazing technique will be applied to the detector development in order to increase detector performances as compared to the typical epoxy-bonding method. The current development status of the advanced X-ray imaging crystal spectrometer will be presented.

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