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12.8 Investigation of toroidal rotation and ion temperature characteristics utilizing X-ray imaging crystal spectrometer on KSTAR

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The X-ray imaging crystal spectrometer (XICS) for the Korea Superconducting Tokamak Advanced Research (KSTAR) device has been actively applying to investigate core toroidal rotation and ion temperature characteristics from helium-like argon spectra since 2009. The XICS system is an important diagnostic for intrinsic toroidal rotation studies for KSTAR because it does not need any external momentum inputs but need a tiny amount of trace Ar gas-puffing. Although the XICS system is ideally suited for not only intrinsic rotation measurements but also all types of auxiliary heating sources it requires a precise calibration for the toroidal rotation since the absolute wavelength calibration for the XICS diagnostic is very difficult. In this presentation, the detail calibration method and procedure, and noticeable characteristics of toroidal rotation from various plasma discharges will be investigated.

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