

Abstract Submitted
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Safety factor profiles from spectral motional Stark effect for ITER applications¹ JINSEOK KO, JINIL CHUNG, HAN MIN WI, Natl Fusion Res Inst — Depositions on the first mirror and multiple reflections on the other mirrors in the labyrinth of the optical system in the motional Stark effect (MSE) diagnostic for ITER are regarded as one of the main obstacles to overcome. One of the alternatives to the present-day conventional photoelastic-modulation-based MSE principles is the spectroscopic analyses on the motional Stark emissions where either the ratios among individual Stark multiplets or the amount of the Stark split are measured based on precise and accurate atomic data and models to ultimately provide the critical internal constraints in the magnetic equilibrium reconstruction. Equipped with the PEM-based conventional MSE hardware since 2015, the KSTAR MSE diagnostic system is capable of investigating the feasibility of the spectroscopic MSE approach particularly via comparative studies with the PEM approach. Available atomic data and models are used to analyze the beam emission spectra with a high-spectral-resolution spectrometer with a patent-pending dispersion calibration technology. Experimental validation on the atomic data and models is discussed in association with the effect of the existence of mirrors, the Faraday rotation in the relay optics media, and the background polarized light on the measured spectra.

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