

Abstract Submitted
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Implementation of MSE Wavelength-Interpolation Background Subtraction on KSTAR¹ STEVEN SCOTT, PPPL, ROBERT MUMGAARD, MIT — A ten-channel polychrometer that simultaneously measures the Motional Stark Effect pi and sigma line polarized emission and two neighboring wavelengths near the MSE spectrum, previously used on Alcator C-Mod, will be implemented at KSTAR in FY17. This will provide accurate measurements of the partially-polarized MSE background emission even in situations where the background varies rapidly in time and space. Data analysis will be performed by a new, tokamak-independent data analysis suite that computes the signal amplitude at many harmonics of the photo-elastic modulator (PEM) frequency using a numerical-beat algorithm. The frequency and phase of the PEM drive signal is computed very accurately by examining successive rise-times of the drive, then reference sinusoidal waveforms are constructed at multiple harmonics. The reference waveform is numerically beat against the measured MSE signal to obtain the signal amplitudes at various PEM harmonics. Availability of signal amplitudes up to the 5th PEM harmonic provides an accurate estimate of the PEM retardance during routine operation. Customizations to the hardware and software for implementation at KSTAR including corrections for Faraday rotation and beam overlap will be discussed.

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