The Motional Stark Effect (MSE) Diagnostic on NSTX

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The adoption of the motional Stark effect (MSE) polarimetry diagnostic is due to its very good temporal and spatial resolution of the q-profile, combined with its exceedingly good accuracy. This has resulted in many important scientific contributions towards our understanding of stability and transport. This work describes the implementation of the MSE-CIF diagnostic on NSTX. Due to the low magnetic field on NSTX the implementation of the MSE diagnostic requires a different approach for the viewing optics and spectral filter. The diagnostic views a heating beam with 8 inch collection optics, imaged onto a fiber array. The optical system is configured to maximize the polarization fraction by reducing the Doppler broadening from the heating beam. This is done with a vertical aperture in front of the collection optics to reduce geometric Doppler broadening. In addition, a wide field Lyot spectral filter with high throughput and high resolution has been developed to achieve the necessary signal-to-noise. Results with the MSE-CIF diagnostic have been obtained at magnetic fields $\geq$0.3 Tesla with eight channels providing coverage from the magnetic axis to near the outboard edge. The number of spatial channels can be increased to 19 in the future. Results of various plasmas regimes including L-mode, H-mode, and reversed shear will be presented.