Development of Reversed Shear and Monotonic q-profiles in NSTX

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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 new approach for the viewing optics and spectral filter. This has been accomplished with a novel optical design that reduces the geometric Doppler broadening, and a high throughput, high resolution spectral filter to optimize signal-to-noise. This MSE diagnostic presently has eight of a possible 19 sightlines operating, providing measurements of the magnetic field line pitch from the plasma center to near the outboard edge of the plasma. The system operates well at low magnetic field, $\geq$0.3 T, using collisionaly induced fluorescence (CIF) from a deuterium heating beam operating at about 90 keV. MSE data has been obtained in several regimes, including L-mode, H-mode, and reversed shear. The measurements reveal the development of both monotonic and reversed shear q-profiles depending on the discharge evolution. The unique aspects of this diagnostic will be discussed as well as the results of analysis now underway to determine the effect of the q-profile in these plasmas on their transport and stability properties.