The Multi-Energy Soft-X-Ray Array is a Novel Compact Diagnostic that Provides £ \tau_p$, and Impurity Profile Information with High Spatial Resolution (< 1 cm) and Fast Time Response (> 10 kHz).

Impurity Transport Modeling with STRAHL is Used to Determine the Diffusive and Convective Transport Coefficients from X-ray Emission

SXR Emissivity Measured with MeSXR (top) Closely Matches Emissivity Calculated Using STRAHL/ADAS (bottom) (from NSTX #142184, 1.1 MA, 5.5 KG)

The ME-SXR Diagnostic and Analysis has been Successfully Implemented for High-Resolution Edge Impurity Transport Measurements in NSTX

Two Proposed Diagnostic Systems would Further Improve Edge Transport Measurements in NSTX Upgrade

A Laser Blow-off Injection System would Constrain the Inner Boundary

- Two Arrays with Core and Edge Sub-Arrays would Constrain the Inner Boundary
- A diagnostics system (described here) and source/sub-array coverage of the core plasma region (source point/pixel resolution) would provide better confidence in the inferred array measurements across the plasma radius, providing a constraint on the boundary of the edge region

- Each Array and STRAHL/ADAS array would provide measurements of the transport parameters and energy budgets of the entire plasma

A Bimier is Needed to Determine the Neutron Source Term in the Plasma Edge

- Non-recycling impurities would eliminate contamination of the impurity source from wall recycling

- Edge-differential source measurements with reduced recycling losses are needed to be investigated further

- Anomalous transport coefficients for diffusion ($D$) and conduction ($v$) are provided by STRAHL along with ($\rho = r/a$) that produce best fits to the data

- Plasma conditions then chosen to examine SXR activity. MHD was stopped, inner source SRP 1.4 M4 to 0.5 M4, outer 4.5 M4 to 0.5 M4, a 1 time after the ~30 ms perturbation, x-ray emission begins to reach a steady state