The Multi-Energy Soft-X-Ray Array is a novel compact diagnostic that provides $F_{\alpha, \beta}$ and impurity profile information with high spatial resolution (<1 cm) and fast time response (>10 kHz).

### Impurity Transport Measurements with the New Multi-Energy Soft-X-Ray Diagnostic on NSTX

**D. Clayton, K. Tritz, D. Stutman, D. Kumar, and M. Finkenthal (JHU)**

**B. LeBlanc (PPPL)**

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

**SRAHL (R. Dux) is a novel impurity particle transport code.**

- **STRahl** solves a radial transport equation for each charge state of an impurity, with the following features:
  - Radial convection is modeled with simple, constant coefficients.
  - Diffusion coefficients are modeled as polynomials of tangency radius.
  - All impurities are considered to be in equilibrium.
  - Neoclassical transport is included.
  - The full ME-SXR diagnostic will be in use, and STRAHL will be used to determine the diffusive and convective transport coefficients from X-ray emissions.

**The Time Evolution of Emission from an Impurity Perturbation is Needed to Distinguish the Effects of Diffusion from Convection**

- **STRahl** uses a time-dependent radial transport equation for each charge state.
- **Initial ME-SXR measurements of neon emission are consistent with the expectation of low diffusion in the plasma edge with the application of lithium to the wall.**
- **The novel capabilities of the ME-SXR system allow an examination of the various mechanisms behind the different ELM phenomena in NSTX.**

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### 100% Be without Emission Controls

- **Neutral source is from user-defined gas puff at the plasma boundary**
- **Solves a radial transport equation for each charge state of an impurity, with the following features:**
  - Radial convection is modeled with simple, constant coefficients.
  - Diffusion coefficients are modeled as polynomials of tangency radius.
  - All impurities are considered to be in equilibrium.
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### Measurements of Multiple Impurities will be performed this year with the full diagnostic

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- **Convexion affects the spatial, and thus charge state, distribution of impurities.**
- **The bolometer array is needed to determine the neon source term in the plasma edge.**

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