

## **Analysis of pellet induced perturbations in NSTX using soft X-ray techniques\***

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A ‘multi-color’ soft X-ray technique is being developed for perturbative transport studies on NSTX. The plasma is simultaneously viewed by soft X-ray arrays filtered in different energy bands and modeling of the emission profiles is used to ‘propagate’ on fast time scales ( $<0.1$  ms) the  $T_e$  profile measured by Thomson scattering. Applied to Type-I ELM perturbations the technique shows good accuracy over tens of ms. The perturbed  $T_e$  profile indicates fast ‘cold pulse’ propagation in the outer plasma, with a marked slow down towards the axis. The incremental electron heat diffusivity has radial dependence quite opposite to that obtained from the power balance. The technique is further applied to perturbations produced by Li pellet injection. The pellet induced emission is recorded in three spectral ranges, with the lowest range ( $>0.1$  keV) providing an image of the Li pellet penetration, estimated to arise from C lines excited by charge exchange with Li neutrals. The higher energy profiles are used to estimate the  $T_e$  and the electron times impurity density perturbation. The capabilities of this technique and initial results from pellet perturbative experiments will be discussed.

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