

Electron Temperature Perturbation Studies on the National Spherical Torus Experiment (NSTX)*

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Perturbations induced via lithium pellet injection (LPI) and ELM events have been used to study the electron thermal transport in NSTX H-mode plasmas using soft X-ray imaging. In both cases, a cold pulse causes a decline in the T_e profile that starts near the plasma edge and propagates to the core while leaving the n_e profile relatively unperturbed. A simple sawtooth time-to-peak model has been applied to the propagation of the cold pulse indicating that the perturbed electron thermal conductance, χ_e , is a few hundred m^2/s at $\rho > 0.4$, which is much higher than the χ_e from typical steady-state power balance calculations. In the center of the plasma, $\rho < 0.4$, where the T_e profile is relatively flat, the perturbed χ_e is a few tens of m^2/s , which is near or below the power balance χ_e . Further study will compare these results to other models, such as the critical gradient model, and expand the analysis to other plasma regimes.

**supported by US DOE grant No. DE-FG02-99ER54523 at JHU and US DOE contract DE-AC02-76CH03073 at PPPL*