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Perturbative electron transport experiments using pellet injection in NSTX D. STUTMAN, K. TRITZ, L. DELGADO, M. FINKENTHAL, Johns Hopkins University, M. BELL, R. BELL, S. KAYE, H. KUGEL, B. LEBLANC, L. ROQUEMORE, PPPL, C. BUSH, R. MAINGI, ORNL, V. SOUKHANOVSKII, LLNL — After the edge perturbation from Type-I ELMs, the perturbed electron transport in NSTX transiently exhibits unusual features, such as ms time scale, global electron temperature crashes. To study this cold pulse propagation we use 'multi-color' SXR imaging with fast diode and 'optical' arrays and produce controlled perturbations with shallow injection of low-Z pellets. The analysis indicates stiff electron temperature profiles and large perturbed electron thermal diffusivity for both pellet and Type-I ELM perturbations. At the same time, the particle diffusivity obtained from the evolution of the pellet injected impurity is about two orders of magnitude lower than the perturbed electron diffusivity, being comparable to the neoclassical value. This seems to exclude low-k electrostatic fluctuations as a cause for the rapid perturbed electron transport in NSTX, suggesting instead high-k fluctuations, or magnetic transport. Results of experiments are presented in which perturbations were introduced as the heating power and q-profile were varied. Supported by DOE Grant DE-FG02-99ER5452 at JHU and Contract DE-AC02-76CH03073 at PPPL.

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