Abstract Submitted
for the DPP11 Meeting of
The American Physical Society

Effect of collisionality on energy transport in NSTX[1] STANLEY KAYE, STEFAN GERHARDT, Princeton Plasma Physics Laboratory, Princeton University, Princeton NJ, RAJESH MAINGI, Oak Ridge National Laboratory, Oak Ridge, TN, RON BELL, AHMED DIALLO, BENOIT LEBLANC, Princeton Plasma Physics Laboratory, Princeton University, Princeton NJ — Lithium (Li) coating of the plasma facing components in NSTX has led to modifications of plasma profiles and the underlying energy transport. With lithium-coated walls, the electron temperature profiles are broader than without lithium, and this is reflected by a sharp reduction in the electron thermal diffusivity. This reduction in electron transport is further manifest as an increase in the thermal energy confinement time overall, as well as H-mode confinement enhancement. The energy confinement scaling of discharges with lithium-coated walls shows a much stronger I_p scaling and weaker B_T scaling than those without lithium coating, similar to the ITER98y,2 scaling trends. The change of confinement with lithium coatings is associated with a concomitant change in collisionality, either through changes in the plasma temperature profiles themselves or the impurity levels. Furthermore, the relative amount of pedestal to core stored energy increases with increasing Li deposition (decreasing collisionality).

[1]This work was supported by U.S. Dept. of Energy Contract Nos. DE-AC02-09CH11466 and DE-AC05-00OR22725.

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Date submitted: 13 Jul 2011 Electronic form version 1.4