

**Topic: EX-C**

## **The Dependence of H-mode Energy Confinement and Transport on Collisionality in NSTX**

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Lithium coating of the plasma facing components in NSTX has had profound effects on the performance of NSTX discharges. For instance, the thermal energy confinement was found to be higher in lithiated discharges, with a much stronger  $I_p$  scaling and weaker  $B_T$  scaling, similar to the ITER98y,2 scaling trends, than in unlithiated ones. Lithiated discharges generally had collisionalities that were up to a factor of three lower than those in unlithiated discharges, but the values of collisionality in both sets of discharges varied and were governed by variations in  $q$ , impurity content and electron temperature profile broadness. It was found that the normalized confinement of a constrained collection of lithiated and unlithiated discharges are well-ordered by collisionality, which unifies the different engineering parameter dependences of discharges with different types of conditioning. The scaling of the normalized confinement time is quite strong as collisionality decreases, with  $B\tau_e \sim \nu^{-0.8}$ , which is favorable for future ST-based FNSF devices.

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