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Gyrokinetic predictions of momentum and impurity transport in NSTX W. GUTTENFELDER, S.M. KAYE, Y. REN, F. SCOTTI, W.M. SOLOMON, R.E. BELL, PPPL, J. CANDY, GA, B.P. LEBLANC, PPPL, H. YUH, Nova Photonics, Inc. — Quasilinear predictions of core momentum transport in NSTX L-modes (unstable to low beta ITG,TEM modes) and H-modes (unstable to high beta "hybrid-KBM" modes) predict Prandtl numbers (Pr= χ_ϕ/χ_i ≈0.2-6) very similar to experimental observations. However, the predicted momentum pinch (RV/χ_ϕ ≈-0.5-1) is much weaker than experiment (-1 to -6). In both L and H mode cases, the predicted momentum pinch is relatively insensitive to variations in density or temperature gradient, collisionality, safety factor, magnetic shear, or electron beta. A comparison will be made with DIII-D simulations at higher aspect ratio to illuminate possible causes for the differing strength of predicted momentum pinch. KBMs in the NSTX core (r/a<0.8) are often predicted to be unstable simultaneously with microtearing (MT) modes, with mode dominance depending on local parameters. Nonlinear simulations are underway to predict the partition of ballooning and tearing mode turbulence under such mixed MT+KBM conditions, and the corresponding balance of energy, impurity and momentum transport. Similar quasilinear predictions of carbon impurity peaking (RV_c/D_c) from KBM modes will be shown for discharges that exhibit strong carbon accumulation. This work is supported by US DOE contract DE-AC02-09CH11466.

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