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Gyrokinetic analysis of thermal transport scaling in NSTX and MAST WALTER GUTTENFELDER, S.M. KAYE, PPPL, J. CANDY, General Atomics, R.E. BELL, B.P. LEBLANC, G.W. HAMMETT, D.R. MIKKELSEN, PPPL, H. YUH, Nova Photonics, A.R. FIELD, M. VALOVIC, CCFE, United Kingdom, W.M. NEVINS, E. WANG, LLNL — It remains unclear how thermal energy confinement will scale when extrapolating from present-day STs to CTF conditions at higher plasma current and toroidal field (lower collisionality). To address this theoretically we present linear gyrokinetic simulations investigating microstability in the outer half-radius of NSTX and MAST discharges that vary I_p and B_T. In high collisionality discharges (low I_p & B_T) microtearing modes are often predicted to be unstable. These modes are weakened when artificially reducing electron collisionality, consistent with experimental scaling trends at higher I_p & B_T. Whether other modes (ITG/TEM, ETG) arise depends on additional parameters such as profile gradients, effective ionic charge, beta, and flux surface shaping. We also discuss the numerical complications in non-linear microtearing mode simulations that include electromagnetic perturbations, collisions and toroidal flow and flow shear.
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