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The role of kinetic electron effects in gyrokinetic turbulence simulations at high and low collisionality¹ DAVID MIKKELSEN, Princeton University, WILLIAM DORLAND, University of Maryland — The influence of kinetic electrons is studied in gyrokinetic turbulence simulations of a C-Mod EDA H-mode plasma. Higher resolution simulations that employ larger domains and extend the range of k_θ qualitatively confirm previous conclusions. First, simulations including realistic geometry, collisions, and kinetic electron effects exhibit a clear Dimits shift in spite of the high collisionality. Second, lowering the collisionality to values more typical of other tokamaks raises the transport and lowers the critical value of R/L_T . Linear stability calculations of primary and secondary modes are used to elucidate the role of collisionality in changing the drive of the primary instability and the damping due to secondary instabilities. The stability calculations are also compared to the different requirements for convergence at low and high collisionality. A new method for estimating the uncertainty of time averaged fluxes is presented, and its robustness is demonstrated by application to many long turbulence simulations.

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David Mikkelsen
mikk@pppl.gov
Princeton University

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