

Gyrokinetic particle simulations of edge pedestal turbulence

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The linear instabilities of a DIII-D H-mode edge pedestal profile [1] are studied with gyrokinetic particle-in-cell simulations. The simulation code GEM is an electromagnetic delta-f code with global tokamak geometry inside the separatrix. In fluxtube simulations we have identified a kinetic ballooning mode (KBM) like instability at the normalized radius $\rho_N=0.965$, which is close to the pedestal top. The critical β of this KBM is around 0.9%. In global simulations of the pedestal, however, the dominant instability seems to be a drift wave in the steep gradient region propagating along the electron diamagnetic direction. The effects of E_r and β are also studied.

[1] J. D. Callen *et al.*, Nucl. Fusion **50**, 064004 (2010).