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Gyrokinetic simulations of microturbulence in DIII-D tokamak pedestal[1] IHOR HOLOD, DANIEL FULTON, SAM TAIMOURZADEH, ZHIHONG LIN, Univ of California - Irvine, RAFFI NAZIKIAN, Princeton Plasma Physics Laboratory, DONALD SPONG, Oak Ridge National Laboratory — The characteristics of H-mode pedestal are generally believed to be constrained by current-driven peeling-ballooning modes and pressure-driven instabilities, such as kinetic ballooning mode (KBM). In this work we use global gyrokinetic code (GTC) to identify and study the edge pressure-driven instabilities in the H-mode pedestal using realistic geometry and plasma profiles of DIII-D shot 131997. In our simulations we observe the KBM mode marginally dominant in the steep gradient region ($\psi_N = 0.98$), in the range of $k_\theta \sim 1cm^{-1}$ which corresponds to the most unstable mode number in the nonlinearly saturated state. For shorter wavelengths the trapped electron mode becomes dominant since its linear growth rate increases with the mode number, while the KBM gets saturated. In the pedestal top region ($\psi_N = 0.95$) the ITG dominates. Resonant magnetic perturbations (RMP) are widely applied for ELM mitigation. During RMP suppression, the increase of edge turbulence is often observed. To understand this phenomena we use gyrokinetic simulations to address the direct effect of magnetic perturbations on the microturbulence. Simulations with 3D equilibrium reconstructed by VMEC code have been compared with toroidally averaged equilibrium, using identical pressure profiles.

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