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Gyrokinetic Studies of Resonant Magnetic Perturbation Effect on Microturbulence in DIII-D H-Mode Pedestal[1] IHOR HOLOD, Lawrence Livermore National Laboratory, ZHIHONG LIN, SAM TAIMOURZADEH, University of California Irvine, RAFFI NAZIKIAN, Princeton Plasma Physics Laboratory, DONALD SPONG, ANDREAS WINGEN, Oak Ridge National Laboratory — Vacuum Resonant Magnetic Perturbation (RMP) applied to otherwise axisymmetric plasmas for the purpose of ELM mitigation produce in general a combination of non resonant effects preserving closed flux surfaces (kink response) and resonant effects that introduce magnetic islands. The effect of the plasma kink response on the stability and transport of edge turbulence is studied using the gyrokinetic code GTC for a DIII-D discharge with applied n=2 vacuum RMP. Three reference equilibria were modeled using VMEC code, based on DIII-D shot 158103: axisymmetric (no RMP) equilibrium, n=2 RMP, and artificially amplified RMPx10 equilibria. Gyrokinetic simulations reveal no increase of growth rates for electrostatic driftwave instability and electromagnetic kinetic-ballooning mode in the presence of the RMP. The effect of RMP on zonal flow damping is found to be insufficient to modify turbulent transport. Therefore, the plasma kink response to the RMP cannot account for the change in the turbulence level seen in experiments with suppressed ELMs. These results demonstrate that other physics must be controlling the transition in confinement responsible for ELM suppression.

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