Abstract Submitted
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Unveiling the kinetic mechanism for RMP penetration in diverted edge geometry[1] C.S. CHANG, Princeton Plasma Physics Laboratory, G. PARK, National Fusion Research Institute, S. KU, Princeton Plasma Physics Laboratory, T. EVANS, General Atomics, R. MOYER, UCSD, THE CPES TEAM — Kinetic understanding of the detailed RMP penetration mechanisms has been obtained for the first time from the Full-f XGC kinetic code in realistic diverted tokamak edge geometry. Kinetic ion and electron dynamics are simulated together with Coulomb collisions and Monte Carlo neutral particles. The system is flux-driven, with the heat and torque sources. It is found that not only the primary response currents, but also the secondary response currents from toroidal coupling is important in understanding the RMP penetration and stochasticity/islands generation. The self-consistent plasma profile response and transport are vitally important. In other words, the RMPs and plasma profile self-organize together. The X-transport also plays an important role. The understandings agree quite well, in qualitative sense, with the experimental findings on DIII-D in the sensitivity to the q-profile, electron collisionality, and in the pedestal profile responses by RMPs including the radial electric field, plasma rotation, and electron perpendicular flow. Stiffness of the outer H-mode confinement layer on RMPs is a natural consequence of the RMP penetration physics in diverted geometry. Turbulence effect and implications to ITER RMP physcs will also be discussed.

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