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Kinetic Simulation of pedestal transport with self-consistent RMP penetration G. PARK, C.S. CHANG, New York University — It is of the highest importance for ITER program to understand the pedestal transport and the RMP penetration physics self-consistently. Coupled kinetic-fluid simulation is performed in a realistic DIII-D diverted geometry, with electrons and ions orbiting under self-consistent 3D RMPs, radial electric field, Coulomb collisions, neutral kinetic transport with wall recycling, impurity radiation, and a heat flux and a torque from the core. For the kinetic edge transport simulation, we use the full-function kinetic ion-electron- neutral guiding-center PIC code XGC0. For fluid simulation, we have installed a proper fluid equation in M3D-OMP. The result shows that the RMP amplitude weakens significantly from the vacuum value within the magnetic separatrix, and that electron density is significantly reduced in a manner qualitatively consistent with experiments. The study reveals that the kinetic effect is essential in understanding the stochastic plasma transport in a toroidal magnetic confinement device.

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