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Self-consistently simulation of RF sheath boundary condition in BOUT++ framework[1] BIN GUI, CASIPP, LLNL, XUEQIAO XU, LLNL, TIANYANG XIA, CASIPP, LLNL — The effect of the RF sheath boundary condition on the edge-localized modes and the turbulent transport is simulated in this work. The work includes two parts. The first part is to calculate the equilibrium radial electric field with RF sheath boundary condition. It is known the thermal sheath or the rectified RF sheath will modify the potential in the SOL region. The modified potential induces addition shear flow in SOL. In this part, the equilibrium radial electric field across the separatrix is calculated by solving the 2D current continuity equation with sheath boundary condition, drifts and viscosity. The second part is applying the sheath boundary condition on the perturbed variables of the six-field two fluid model in BOUT++ framework. The six-field two-fluid model simulates the ELMs and turbulent transport. The sheath boundary condition is applied in this model and it aims to simulate effect of sheath boundary condition on the turbulent transport. It is found the sheath boundary plays as a sink in the plasma and suppresses the local perturbation. Based on this two work, the effect of RF sheath boundary condition on the ELMs and turbulent transport could be self-consistently simulated.

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