

Abstract Submitted  
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**Impurity migration with RF sheath and ELMs perturbed electric field in tokamak**<sup>1</sup> BIN GUI, XIAOTAO XIAO, CASIPP, TENGFEI TANG, DLUT, LLNL, XUEQIAO XU, LLNL — In radio frequency (RF) experiments, impurity generation and transport are important due to the phenomenon of RF enhanced impurity generation. In BOUT++ framework, the equilibrium radial electric field with RF sheath boundary condition on the limiter or the divertor surface is self-consistently calculated by using a two-field model. Based on this self-consistent calculation, it is found the positive radial electric field forms in the SOL region which qualitatively agrees with the experimental on the TEXTOR. The test particle module is developed in BOUT++ framework to simulate both turbulence and neoclassical physics in realistic geometry. Firstly, the drift orbit is calculated in cylinder coordinates due to singularity of x-point in flux coordinate. The turbulence transport of impurity generated from hot spot of RF limiter is simulated by random walk model. The numerical results show that less impurities will migrate into core and divertor region, more impurities migrate into nearby SOL boundary when turbulence transport enhanced. Then the effect of RF sheath potential on impurity migration will be simulated. Using the perturbed electric field from our BOUT++ nonlinear ELMs simulation, the transport of the impurities in different phase of ELMs are also discussed.

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