Abstract Submitted
for the DPP15 Meeting of
The American Physical Society

Development of test particle module for impurity transport in BOUT++ framework[1] XIAOTAO XIAO, CASIPP, LLNL, TENGFEI TANG, DLUT, LLNL, XUEQIAO XU, LLNL — Impurity generation and transport are an important topic of research under reactor relevant conditions in order to avoid a significant confinement degradation of the fusion plasmas. It is also a critical issue for RF experiments due to the phenomenon of rf-enhanced impurity generation. Developing the test particle module in BOUT++ framework, which simulates tokamak edge plasmas using fluid models, will enhance the capability to efficiently simulate both turbulence and neoclassical physics in realistic geometry. Firstly, the guiding-center orbit is calculated in cylinder coordinates due to singularity of x-point in flux coordinate. Then evolution of radial profile of impurities in edge plasmas from given sources at the divertor plates and at the protection limiters near RF antennas is obtained by a random walk turbulence model. The characteristics of impurity transport during the ELMs cycles are also simulated by adding a time varying three dimensions perturbed electric field under BOUT++ framework.

[1]Prepared by LLNL under Contract DE-AC52-07NA27344. LLNL-ABS-675025

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Date submitted: 22 Jul 2015 Electronic form version 1.4