Abstract Submitted
for the DPP17 Meeting of
The American Physical Society

Recent Progress in BOUT++ boundary plasma turbulence simulations[1] X.Q. XU, LLNL, BOUT++ TEAM — BOUT++ has been developed and applied for a range of problems that impact on boundary plasma turbulence and transport. A summary of simulation progress and results will be presented including, but not limited to: (1) Modeling tokamak boundary plasma turbulence and understanding its role in setting divertor heat flux widths; (2) Self-consistent calculation of the radial electric field with ion orbit loss mechanism; (3) Simulating the DIII-D and EAST grassy ELM regime; (4) Simulation comparison of EHO state and broadband MHD phase in near-zero torque QH-mode on DIII-D; (5) Simulation of the ELMs triggering by lithium pellet on EAST tokamak; (6) Ideal MHD Stability and Characteristics of Edge Localized Modes on CFETR Our latest transport module solves a set of transport equations with quasi-neutral constraint using vorticity formulation under the BOUT++ framework. This new capability enables BOUT++ team to simulate boundary plasma transport across the separatrix with self-consistent electric and magnetic drifts, ion orbit loss, and sheath boundary conditions in the scrape-off-layer. Preliminary results of the coupled turbulence and transport simulations will also presented.

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

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Date submitted: 14 Jul 2017 Electronic form version 1.4