Abstract Submitted
for the DPP16 Meeting of
The American Physical Society

Continuum Gyrokinetic Simulations of Turbulence in Open-Field-Line Plasmas[1] E.L. SHI, Princeton University, G.W. HAMMETT, Princeton Plasma Physics Laboratory, T. STOLTZFUS-DUECK, Princeton University, A. HAKIM, Princeton Plasma Physics Laboratory — We have performed our first 3D2V gyrokinetic simulations of electrostatic plasma turbulence in open-field-line geometries using the full-F discontinuous-Galerkin code Gkeyll. These simulations include the basic elements of a scrape-off layer: localized sources to model plasma outflow from the core, cross-field turbulent transport, parallel flow along magnetic field lines, and parallel losses at the limiter or divertor with sheath boundary conditions. The set of boundary conditions used in our model allows currents to flow through the walls and satisfies energy conservation. In addition to details of our numerical approach, we will present results from flux-tube simulations of devices containing straight-field lines (such as LAPD) and helical-field-lines (such as the TORPEX simple magnetized torus). Preliminary results show turbulent fluctuation levels similar to fluid simulations, which are comparable to the observed fluctuation level in LAPD but somewhat smaller than observed in TORPEX.

[1]This research was supported by the Max-Planck/Princeton Center for Plasma Physics, the SciDAC Center for the Study of Plasma Microturbulence, and U.S. DOE contract DE-AC02-09CH11466.

E.L. Shi
Princeton University

Date submitted: 15 Jul 2016 Electronic form version 1.4