Abstract Submitted
for the DPP17 Meeting of
The American Physical Society

A New Parallel Boundary Condition for Turbulence Simulations in Stellarators MIKE F MARTIN, MATT LANDREMAN, WILLIAM DORLAND, University of Maryland, PAVLOS XANTHOPOULOS, Max-Planck-Institut fr Plasmaphysik — For gyrokinetic simulations of core turbulence, the "twist-and-shift" parallel boundary condition (Beer et al, PoP, 1995), which involves a shift in radial wavenumber proportional to the global shear and a quantization of the simulation domain's aspect ratio, is the standard choice. But as this condition was derived under the assumption of axisymmetry, "twist-and-shift" as it stands is formally incorrect for turbulence simulations in stellarators. Moreover, for low-shear stellarators like W7X and HSX, the use of a global shear in the traditional boundary condition places an inflexible constraint on the aspect ratio of the domain, requiring more grid points to fully resolve its extent. Here, we present a parallel boundary condition for "stellarator-symmetric" simulations that relies on the *local shear* along a field line. This boundary condition is similar to "twist-and-shift", but has an added flexibility in choosing the parallel length of the domain based on local shear consideration in order to optimize certain parameters such as the aspect ratio of the simulation domain.

Mike Martin
University of Maryland

Date submitted: 06 Jul 2017 Electronic form version 1.4