Abstract Submitted
for the DPP08 Meeting of
The American Physical Society

Global gyrokinetic simulation of ITER plasmas using coupled flux tubes[1] MICHAEL BARNES, WILLIAM DORLAND, University of Maryland, GREG HAMMETT, PPPL — To faithfully simulate ITER and other modern fusion devices, we must resolve electron and ion fluctuation scales in a five-dimensional phase space and time. Simultaneously, we must account for the interaction of this turbulence with the slow evolution of the large-scale plasma profiles. Because of the enormous range of scales involved and the high dimensionality of the problem, resolved first-principles global simulations are very challenging using conventional (brute force) techniques. We have developed a new approach in which turbulence calculations from multiple gyrokinetic flux tube simulations from GS2 are coupled together using transport equations to obtain self-consistent, steady-state background profiles and corresponding turbulent fluxes. We will present results obtained from coupled flux tube simulations of the core of an ITER plasma, including multiple species, electromagnetic effects, and realistic magnetic geometry.

[1]Research funded by the Center for Multiscale Plasma Dynamics

Michael Barnes
University of Maryland

Date submitted: 18 Jul 2008 Electronic form version 1.4