Global gyrokinetic simulations using coupled flux-tubes[1]

MICHAEL BARNES, WILLIAM DORLAND, University of Maryland — A full
treatment of the transport problem in modern fusion devices requires simultaneous resolution of rapidly-evolving, small-scale turbulence and slowly-evolving, large-scale variation of background profiles. The multiscale nature of the problem makes it computationally expensive. Consequently, relatively few high resolution global simulations exist. We extend the continuum gyrokinetic code GS2 to explore the use of coupled flux-tube simulations to simulate global plasma dynamics efficiently. Coupling between flux-tubes is achieved by solving the recently developed gyrokinetic transport equations of Wang, Plunk and Cowley. This allows us to obtain the self-consistent, steady-state, background profiles and corresponding turbulent fluxes. We present and discuss preliminary results.

Michael Barnes
University of Maryland