Abstract Submitted
for the DPP01 Meeting of
The American Physical Society

Sorting Category: 5.6.2 (Theory/Computational)

Progress in Modeling Internal Transport Barrier Formation Using the GLF23 Transport Model[1] J.E. KINSEY, Lehigh U., G.M. STAEBLER, R.E. WALTZ, GA — Significant progress has been made in predicting internal transport barrier (ITB) in tokamaks. Results are presented for simulations of the thermal and toroidal momentum transport in L- and H-mode ITB discharges using the GLF23 driftwave model. The turbulence suppression mechanisms of E×B shear and Shafranov shift stabilization are essential in reproducing the observed core barriers in the ion and/or electron transport. While E×B shear can suppress the transport due to low to intermediate wavenumber (k) ITG/TEM modes, Shafranov shift can reduce the low-k (ITG) and high-k (ETG) modes for reversed magnetic shear resulting in simultaneous electron and ion barriers. The model predicts the temperature and toroidal velocity profiles for more than 20 ITB discharges from DIII-D, TFTR, and JET with an RMS error in the incremental stored energy of 13%. The same model reproduces the temperature profiles from over 100 L- and H-mode discharges without ITBs. For reversed-shear cases in FIRE and ITER-FEAT, an ITB is predicted as a result of α-stabilization and diamagnetic E×B shear stabilization with modest density peaking.

[1]Supported by the US DOE under DE-FG03-95ER54309 and DE-FG03-92ER54141.

[X] Prefer Oral Session
[ ] Prefer Poster Session

J.E. Kinsey
kinsey@gav.gat.com
Lehigh University

Date submitted: July 20, 2001

Electronic form version 1.4