

Abstract Submitted
for the DPP10 Meeting of
The American Physical Society

Gyrokinetic Eigenmode Analysis of High-Beta Shaped Plasmas¹

J. CANDY, E.A. BELLI, General Atomics — The effect of compressional magnetic perturbations on gyrokinetic stability and transport in moderate and high-beta shaped plasmas is studied using GYRO. In high-beta plasmas, closely-spaced branches of unstable eigenmodes exist, and are difficult and time-consuming to resolve with existing linear initial-value solvers. For this reason, a fast Maxwell-dispersion-matrix eigenvalue solver has been developed and applied to systematic studies of the linear eigenmode spectrum in representative DIII-D and NSTX discharges. As expected, compressional perturbations are mostly negligible in DIII-D but significant in NSTX for which both low-k, hybrid ITG-like/KBM-like modes as well as high-k mode cascades are observed. Finally, we present a transport analysis for both machines in terms of the full 4-3 transport matrix; that is, four transport coefficients (particle flux, momentum flux, energy flux, anomalous exchange) decomposed into three transport channels (electrostatic, transverse electromagnetic, compressional electromagnetic).

¹Supported by US DOE under DE-FG02-95ER54309.

Ron Waltz
General Atomics

Date submitted: 19 Jul 2010

Electronic form version 1.4