Abstract Submitted
for the APR09 Meeting of
The American Physical Society

Dynamic Behavior of Peeling-Ballooning Modes in a Shifted-Circle Tokamak Equilibrium[1] B. SQUIRES, UW-Madison, S.E. KRUGER, TechX, C.C. HEGNA, UW-Madison, E. HELD, USU, P.B. SNYDER, General Atomics, C.R. SOVINEC, P. ZHU, UW-Madison — Progress in understanding edge localized modes (ELMs) has been made by investigating the stability properties of peeling-ballooning modes. We focus on the linear and nonlinear evolution of the peeling-ballooning modes over the entire spectrum in a shifted-circle tokamak equilibrium, using the extended-MHD code NIMROD. The TOQ-generated equilibrium models an H-mode plasma with a pedestal pressure profile and parallel driven edge currents. A vacuum region is prescribed by a resistivity profile that transitions from a small to very large value at a specified location. We manipulate the modes that govern the pedestal evolution, by changing this location. Ballooning-like instabilities dominate distant vacuum cases, whereas peeling mode physics is expected to dominate as the vacuum approaches the pedestal. An extensive nonlinear study is planned in addition to a linear analysis as functions of the pedestal parameters and vacuum location. We present our linear results and nonlinear computational comparisons between the peeling-dominated and ballooning-dominated mode evolution.

[1]The research was performed under appointment to the FES Fellowship and supported by the U.S. DOE under grant no.DE-FG02-86ER53218.

Bonita Squires
UW-Madison

Date submitted: 08 Jan 2009 Electronic form version 1.4