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Dynamic Behavior of Peeling-Ballooning Modes in a Shifted-Circle Tokamak[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 preliminary nonlinear computational comparisons with the recent theory development on the nonlinear regimes of ballooning instability.

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