Abstract Submitted
for the DPP12 Meeting of
The American Physical Society

Two-fluid edge plasma stability analysis in divertor tokamak geometry TOM NEISER, UCLA, DEREK BAVER, Lodestar Reserach Corporation, TROY CARTER, UCLA, JAMES MYRA, Lodestar Reserach Corporation, PHILIP SNYDER, General Atomics, MAXIM UMANSKY, LLNL — Plasma in the edge region of tokamaks sets a boundary condition for the core plasma and interacts with plasma facing components. Edge Localized Modes, which occur in some high-confinement mode plasmas, can restrict the pedestal height and send large heat loads to the divertor. This work applies 2DX, a code capable of solving eigenvalue problems of any fluid model [1], to the ideal magnetohydrodynamic (MHD) fluid models associated with the edge region. Currently, this code has been successfully benchmarked against linear ideal MHD codes such as ELITE [2] for simple shifted circle geometry and ballooning dominated cases of peeling-ballooning (P-B) modes [3]. We extend this simple geometry study to peeling dominated cases before studying P-B modes in the more general case of strongly shaped two-fluid plasmas. Moreover, this code can be used to extend analysis of P-B modes across the separatrix to assess the effect of the scrape off layer model on stability. Ultimately, this code can also be benchmarked against non-ideal MHD models.

[1] D.A. Baver et al., Comp. Phys. Comm. 182, 1610 (2011).
[2] H.R. Wilson et al., Phys. Plasma 9, 1277 (2002).
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Date submitted: 19 Jul 2012 Electronic form version 1.4