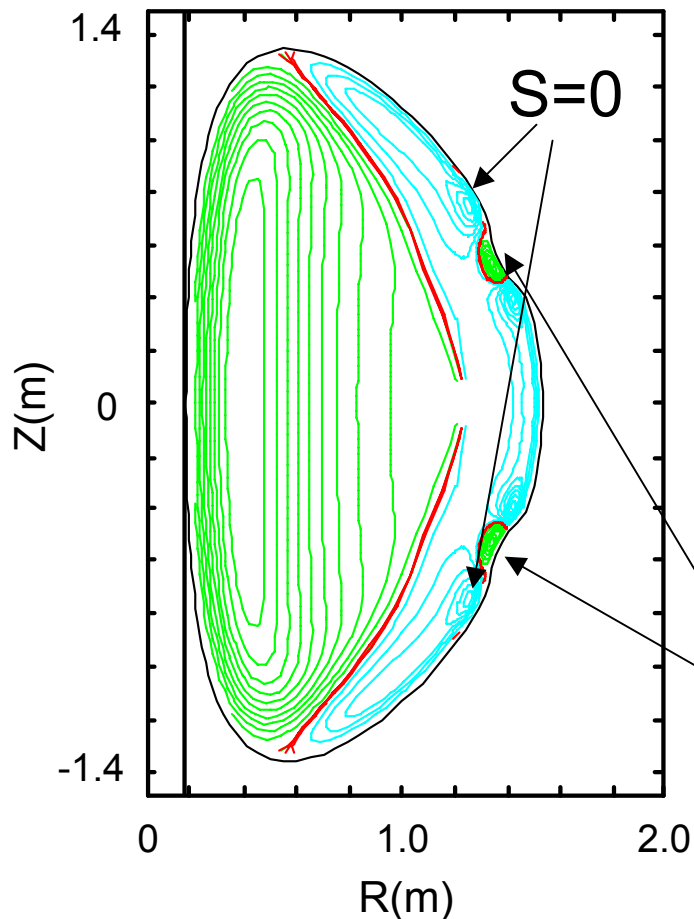


Effect of Boundary Shape on Plasma Stability (“Dimple” Study)

S. Kaye, F. Paoletti, J. Manickam, S. Zweben,

- Stability calcs by Manickam and Paoletti have shown the boundary “dimple” created by use of PF4 can destabilize ballooning modes near the edge of the plasma and reduce the achievable beta by 20% (Paoletti, *tbp*, Nuc. Fusion, 2001)



-PF5 was designed and constructed to avoid the dimple

- The ability to produce this dimple feature, however, provides a test of how sensitive the plasma stability is to boundary shape

Large $\nabla p k_n$

Optimized profiles

- This XP is in the developmental stage – much scenario development needed
- Determine optimum location in operations space for XP
 - Low I_i , broad $p(r)$
 - Determine stability between PF4 and PF5 generated boundaries
 - Minimize low- n mode effect (want high- n instability only)
 - Adjust PF currents (magnitude of dimple) triangularity, profiles to achieve high- n instability with PF4 boundary, but stability with PF5 boundary
- Experiment needs XMPs to be run first
 - PF4 commissioning
 - Need for MSE (how sensitive are results to variation in $j(r)$, especially near edge)?