Abstract Submitted
for the DPP09 Meeting of
The American Physical Society

The effects of sheared flow and parallel viscosity on the RWM stability boundaries[1] S.P. SMITH, S.C. JARDIN, PPPL, J.P. FREIDBERG, MIT, L. GUAZZOTTO, U. Rochester — The complete spectrum of ideal MHD modes is computed for a flowing circular cylindrical plasma surrounded by a resistive wall. The formulation for the computation casts the MHD stability problem in the standard form $\omega Ax = Bx$ by coupling the resistive wall to the surface plasma perturbations using a Green's function technique. In looking at the complete spectrum, it is shown that the unstable resistive wall mode (RWM) can be stabilized by uniform flow when i) The damped RWM in the absence of flow resonates with the sound continuum and ii) The Doppler shift associated with the flow is greater than the damped mode's real frequency in the absence of flow. By introducing flow shear, it is shown that the value of the flow at the sound resonant surface is the parameter which most determines stabilization (as opposed to the flow shear at the sound resonant surface or the value of the flow at the edge of the plasma.) Convergence studies demonstrate complete stabilization in the limit of zero grid size even in the absence of parallel viscosity. Introducing explicit parallel viscosity reduces the resolution requirements for convergence, but does not affect the region of stability.

[1]This work was partly performed under contract DE-AC05-06OR23100 between the US DOE and ORAU.

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Date submitted: 17 Jul 2009 Electronic form version 1.4