

Abstract Submitted  
for the DPP00 Meeting of  
The American Physical Society

Sorting Category: 6.6.2 (Theoretical)

**Modeling of Feedback Stabilization of External MHD  
Modes in Toroidal Geometry**<sup>1</sup> M.S. CHU, General Atomics, M.S.

CHANCE, M. OKABAYASHI, Princeton Plasma Physics Laboratory  
— The intelligent shell feedback scheme<sup>2</sup> seeks to utilize external coils  
to suppress the unstable MHD modes slowed down by the resistive shell.  
We present a new formulation and numerical results of the interaction  
between the plasma and its outside vacuum region, with complete  
plasma response and the inclusion of a resistive vessel in general toroidal  
geometry. This is achieved by using the Green's function technique,  
which is a generalization of that previously used for the VACUUM<sup>3</sup>  
code and coupled with the ideal MHD code GATO. The effectiveness of  
different realizations of the intelligent shell concept is gauged by their  
ability to minimize the available free energy to drive the MHD mode.  
Computations indicate poloidal coverage of 30% of the total resistive  
wall surface area and 6 or 7 segments of “intelligent coil” arrays su-  
perimposed on the resistive wall will allow recovery of up to 90% the  
effectiveness of the ideal shell in stabilizing the ideal external kink.

<sup>1</sup>Supported by U.S. DOE Grant DE-FG03-95ER54309 and Contract DE-  
AC02-76CH03073.

<sup>2</sup>C.M. Bishop, Plasma Phys. Contr. Nucl. Fusion **31**, 1179 (1989).

<sup>3</sup>M.S. Chance, Phys. Plasmas **4**, 2161 (1997).

- Prefer Oral Session  
 Prefer Poster Session

M.S. Chu  
chum@fusion.gat.com  
General Atomics

Special instructions: MHD, immediately following GA Navratil

Date submitted: July 11, 2000

Electronic form version 1.4