

Abstract Submitted  
for the DPP00 Meeting of  
The American Physical Society

Sorting Category: 6.2.2 (Theoretical)

**Sensitivity Studies of Tearing Mode Stability Calculations**<sup>1</sup> D.P. BRENNAN, E.J. STRAIT, M.S. CHU, A.D. TURNBULL, T.S. TAYLOR, General Atomics, S.E. KRUGER, SAIC — For high  $\beta$ , highly shaped plasmas in the DIII-D tokamak, the value of the tearing mode stability index  $\Delta'$  calculated at a rational surface can depend sensitively on the pressure and current profiles when an ideal mode is near marginal stability in the equilibrium current profile parameter space. Using a single time slice of experimental data and fitting equilibria around a minimum in  $\chi^2$ , we show that an estimate of the error in  $\Delta'$  will be small when no ideal mode is present. Also, the  $\Delta'$  calculation will systematically indicate linear stability to tearing modes ( $\Delta' < 0$ ) when a global ideal mode is present. Between these regions, near marginal stability for the global ideal mode, a pole in  $\Delta'$  exists as predicted by analytic theory [ $\mu = (-D_I)^{1/2}$  is near 0.5 at the rational surface], and the proximity of the best equilibrium fit to this pole in parameter space is crucial to the accuracy of the tearing mode stability calculation. These results will be applicable to the study of ECCD stabilization of tearing modes, and the accuracy of stability studies of parameterized current peaks at rational surfaces is discussed.

<sup>1</sup>Supported by US DOE Contract DE-AC03-99ER54463.

Prefer Oral Session  
 Prefer Poster Session

D.P. Brennan  
brennan@fusion.gat.com  
General Atomics

Special instructions: 8th poster in MHD Session (after Snyder, before La Haye)

Date submitted: July 12, 2000

Electronic form version 1.4