

Abstract Submitted
for the DPP00 Meeting of
The American Physical Society

Sorting Category: 6.2.2 (Computation/Simulation)

**Stability and Nonlinear Dynamics of the Tokamak
Edge Region, with Parallel Current**¹

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XU, LLNL, H.R. WILSON, Culham, M.S. CHANCE, PPPL — The-
oretical analysis of edge instabilities which may control the pedestal
height and width is complex, in part because the sharp pressure gra-
dients, and consequent large bootstrap currents, near the H-mode edge
can destabilize kink, peeling, and ballooning modes over a wide range
of toroidal mode numbers (n). An important modification of classical
ballooning theory [Conner et al.] allows treatment of the coupled system
of edge ballooning and peeling modes at higher $n \gtrsim 10$. Use of a non-
local edge ballooning/peeling code ELITE together with low- n stability
codes allows the study of the ideal MHD edge stability of real tokamak
equilibria over essentially the full spectrum of toroidal modes, leading to
insights on ELMs and the importance of parallel current. To study the
impact of X-point geometry, non-ideal effects, and nonlinear dynamics,
simulations are carried out on the electromagnetic Braginskii code BOUT,
enhanced to include parallel current terms.

¹Supported by US DOE Contracts DE-FG03-95ER54309, W-7405-ENG,
DE-AC02-76CH03073, UK Depart. of Trade and Industry, and Euratom.

- Prefer Oral Session
 Prefer Poster Session

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Special instructions: 7th poster in MHD Session (after Ferron, before Brennan)

Date submitted: July 12, 2000

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