Abstract Submitted
for the DPP98 Meeting of
The American Physical Society

Sorting Category: 5.1.1.2 (experimental)

Identification of Intermediate n Ideal MHD Kink-Peeling Modes with ELMs in DIII–D H–Mode Discharges[1]
A.D. TURNBULL, T.H. OSBORNE, E.J. STRAIT, L.L. LAO, R.L. MILLER, T.S. TAYLOR, General Atomics — Recent calculations based on improved equilibrium reconstructions for DIII–D ELMing H–mode discharges with steep edge pressure gradients show a clear correlation between observed Type I ELMs and the prediction of unstable strongly edge localized ideal MHD intermediate $n > 3$ modes. Since discovery of the H–mode and the associated ubiquitous edge localized modes (ELMs), the cause of the ELMs has remained something of a mystery. Various instabilities have been proposed — for example, ideal ballooning modes driven by edge pressure gradients appeared to correlate with simple estimates of the ballooning limit — but none have held up to more detailed analyses and no definite correlations have been demonstrated. Recent discharges have demonstrated access to the second stable regime for ballooning modes near the edge. The predicted intermediate n kink modes are driven by edge pressure gradient, bootstrap current, and Pfirsch-Schlüter current. The unstable modes are similar to those thought to be responsible for the termination of the VH–mode and H–mode NCS discharges, but have higher n and stronger edge localization.

[1]Work supported by U.S. DOE Contract DE-AC03-89ER51114.

A.D. Turnbull
turnbull@gav.gat.com
General Atomics

☐ Prefer Oral Session
☒ Prefer Poster Session

Special instructions: DIII–D Poster Session I (transport, turbulence, & stability), immediately following Lao

Date submitted: July 22, 1998 Electronic form version 1.3