

Abstract Submitted
for the APR09 Meeting of
The American Physical Society

Internal Kink Stability and Its Relation to Tokamak Sawteeth¹

A.D. TURNBULL, M. CHOI, L.L. LAO, General Atomics, E.A. LAZARUS, ORNL, N. GORELENKOV, PPPL — Analysis of sawtooth cycles using the Porcelli model [1] for specific DIII-D discharges shows that several features of the stability do not follow the conventional picture. Notably, the ideal stability does not necessarily degrade during the ramp as the axis q drops. Instead, the stabilizing contributions are weakened largely due to the changing equilibrium conditions. The Porcelli and NOVA-K [2] models are compared against the experiments. The fast particle stability contribution from NOVA-K is sensitive of varying pitch angle distribution. Yet, using reconstructed equilibria, the simpler Porcelli model yields results in agreement with experiment. This is investigated by studying the dependence of the NOVA-K results on the distribution. Accurate modeling of the actual fast ion distribution is key and a method for obtaining this from the limited statistics of a Monte-Carlo simulation is described.

[1] F. Porcelli, et al., Plasma Phys. Control. Fusion 38 (1996) 2163.

[2] C.Z. Cheng, Physics Reports 211 (1992) 1.

¹Work supported by the U.S. Department of Energy under DE-FG02-95ER54309, DE-AC05-00OR22725 and DE-AC02-76CH03073.

A.D. Turnbull
General Atomics

Date submitted: 09 Jan 2009

Electronic form version 1.4