Abstract Submitted
for the DPP96 Meeting of
The American Physical Society

Sorting Category: 5.1.1.2 (Experimental)

Parameterization of Edge Profiles for H–mode Studies,[1] R.J. GROEBNER, T.N. CARLSTROM, General Atomics — A deeper understanding of the physics of the H–mode requires a convenient way to characterize the edge density and temperature profiles in L–mode and H–mode. For this goal, an algorithm has been developed which fits a hyperbolic tangent function plus a linear term to edge profile data. This technique provides a characterization of edge transport barriers in terms of a few parameters: the position of the middle of the barrier, the width of the barrier and the height of the pedestal. Applied to time series data from Thomson scattering in DIII–D, this algorithm has uncovered phenomena such as the following: 1) In studies of HL (back) transitions, the pedestal value of T_e drops as the power flow through the edge of the plasma is decreased and the back transition occurs when T_e falls to near its value at the time of the LH transition. In contrast, the pedestal value of n_e tends to remain unchanged during the H–mode and drops very rapidly at the time of the back transition. 2) Transitions to H–mode at very low values of density tend to show little change in the D_α waveforms. The analysis described here shows that transport barriers of edge n_e and T_e develop on a timescale of tens of milliseconds with the T_e pedestals being much more prominent relative to the n_e pedestals than in more conventional H–modes. The hyperbolic tangent fit is being extended to include edge T_i.

[1]Work supported by the U.S. DOE Contract No. DE-AC03-89ER51114.

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Special instructions: P-1-21

Date submitted: August 1, 1996 Electronic form version 1.1