

Abstract Submitted
for the DPP96 Meeting of
The American Physical Society

Sorting Category: 5.1.1.2 (Experimental)

Studies of Edge Neutral Density Distributions in L- and H-mode Discharges¹ B.A. CARRERAS, L. OWEN, R. MAINGI, P. MIODUSZEWSKI, Oak Ridge National Laboratory, T.N. CARLSTROM, R.J. GROEBNER, General Atomics — The transition from L to H-mode as well as the H-mode quality on tokamaks has been found to depend strongly on wall conditions and, in particular, on the observed neutral density and H_α radiation in the plasma edge. It is suspected that edge neutrals affect the conditions that generate transport barriers in H-mode confinement regimes. The neutrals give rise to a variety of atomic effects in the plasma edge of which some may be substantial enough to alter the energy and/or momentum balance there. In order to model these effects, detailed information on the neutrals processes distributions and is needed. These data are not easily available from present fusion machines. In order to generate the needed data set, we are benchmarking existing plasma edge data of well characterized DIII-D discharges with the B2-DEGAS computer codes and calculate the required neutrals data as output from the code. The “data” generated with these simulations are then used to constrain the modeling of the neutrals effects on L-H transition and power threshold.

¹Work supported by the U.S. DOE Contract Nos. DE-AC05-96OR22464 and DE-AC03-89ER51114.

Prefer Oral Session
 Prefer Poster Session

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Special instructions: P-1-24

Date submitted: August 1, 1996

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