Abstract Submitted
for the DPP97 Meeting of
The American Physical Society

Sorting Category: 5.1.1.2 (experimental)

Overview of Density Limit Experiments on DIII–D[1] R. MAINGI, L.R. BAYLOR, T.C. JERNIGAN, M.R. WADE, Oak Ridge National Laboratory, M.A. MAHDAVI, A.W. HYATT, R.J. LA HAYE, T.H. OSBORNE, T.W. PETRIE, and the DIII–D Team, General Atomics — In 1996 DIII–D embarked on a campaign to develop a path to achieve $\bar{n}_e$ above the Greenwald limit (n_{GW}) with H–mode confinement. By identifying the processes which limit $\bar{n}_e$ and using pellet fueling, we demonstrated[2] $\bar{n}_e \sim 1.5{*}n_{GW}$ with H–mode confinement, albeit in a narrow parameter space. We have examined the behavior of edge pedestal parameters and found 2 regimes: with low q_{95} operation, $T_e^{edge} \propto 1/n_e^{edge}$, and the edge electron pressure (P_e^{edge}) and τ_e stay fixed until the density limit. With high q_{95} operation, the P_e^{edge} and τ_e are very high at low n_e^{edge}. As we raise n_e^{edge}, $T_e^{edge} \propto 1/(n_e^{edge})^{\alpha}$ where $\alpha > 2$; consequently, the P_e^{edge} and τ_e degrade well below the density limit. The drop in T_e^{edge} correlates strongly with an increase in the private region neutral pressure. This year's experiments focus on pellet fueling with our new upper divertor structure and cryopump which allows us to pump high δ discharges; this should improve MHD stability. Comparisons of density limits in the high and low δ configurations will be presented.

[1]Supported by U.S. DOE Contracts DE-AC05-96OR22464, DE-AC03-89ER51114.
[2]R. Maingi *et al.*, Phys. Plasma **5** (1997) 1752.

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[X] Prefer Oral Session
[ ] Prefer Poster Session

Date submitted: July 8, 1997 Electronic form version 1.2