n Invited Paper
96 Meeting of
Physical Society

Plasma Density in DIII–D[1]

tute for Science and Education, Oak Ridge, Tennessee

density is crucial in achieving peak performance in confined
cated the existence[2] of an operational density limit (Greenwald
ndependent of heating power. Several theories have reproduced
ependence in the data has presented an enigma. This limit
or (ITER) because the nominal operating density for ITER is
nderstand the physical processes which limit operating density
E formation, high core recycling and neutral pressure, resistive
affect plasma properties, i.e. edge/scrape-off layer conduction
ensity profile, and core radiation, which in turn restrict the
pellet fueling, core neutral pressure is reduced and X-point
argest-sized pellets does cause transient formation of divertor
se are rapidly extinguished in pumped discharges in the time
t the density relaxation time after pellets is largely independent
of Mirnov oscillations indicates the de-stabilization and growth
ed pellets cause large density perturbations, and these modes
re examining the mechanisms for de-stabilization of the mode,
s. Discharges with a gradual density increase are often free of
density regimes in which off-axis beam deposition can lead to
highest achieved $\bar{n}_{\rm e}$ was $1.5 \times n_{\rm max}^{\rm GW}$ with $\tau_{\rm E}/\tau_{\rm E}^{\rm JET-DIII-D} \geq 0.9$.
$^{\rm GW}_{\rm max}$. Implications of these results for ITER will be discussed.

act Nos. DE-AC05-ER96OR22464 and DE-AC03-89ER51114.