

Update: C82 Equilibrium Quality

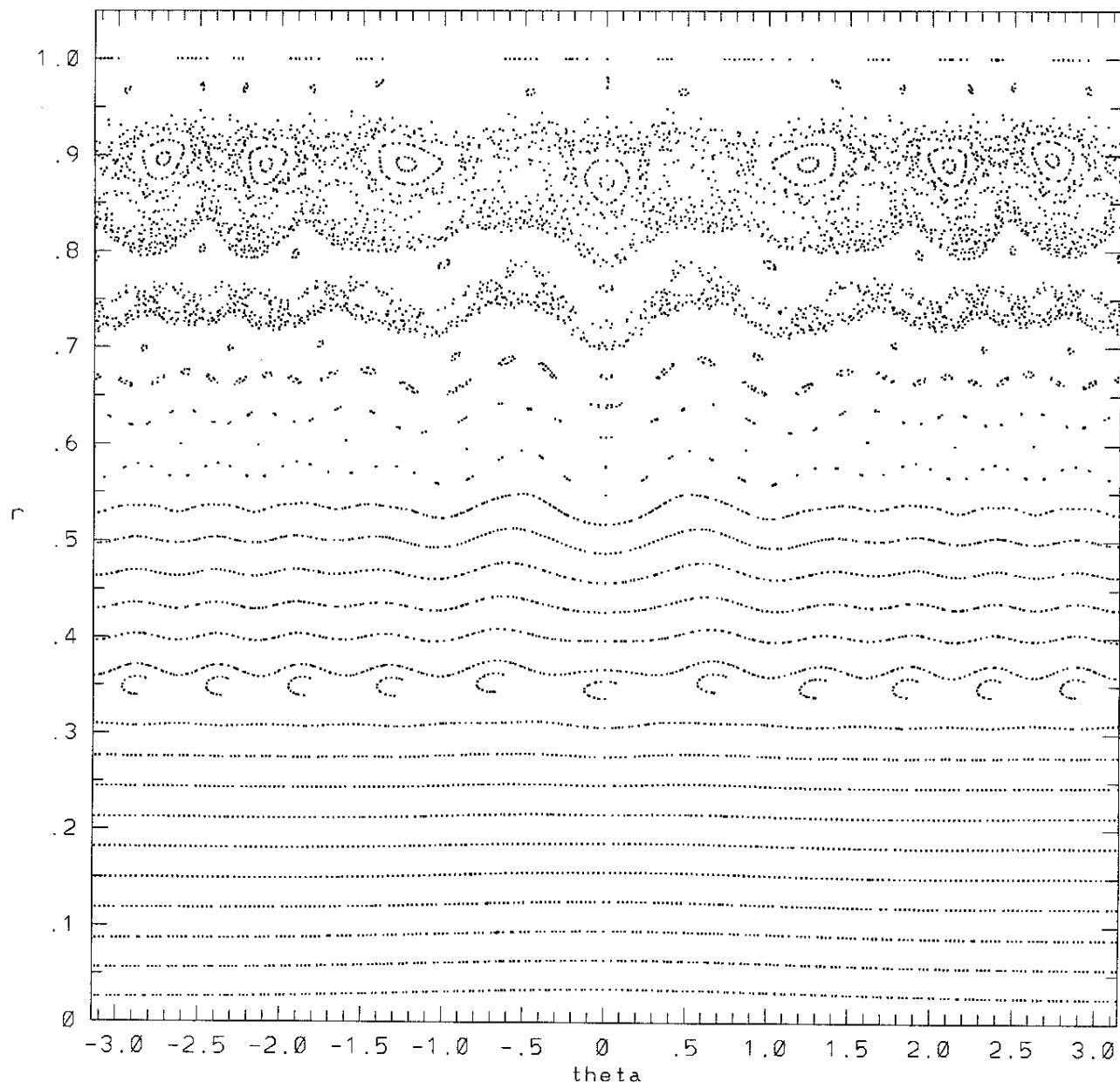
Don Monticello

- **Outline**

- **c82 flux surface comparison: two pressure profiles**
 - ballooning unstable pressure profile
 - ballooning stable pressure profile
- **W7-AS flux surfaces as predicted by PIES**
 - PIES iota and surface comparison with vme_c run from EPS 1997
 - confinement quality - 1996 IAEA paper

C 82 after 1 iteration

Ballooning unstable pressure

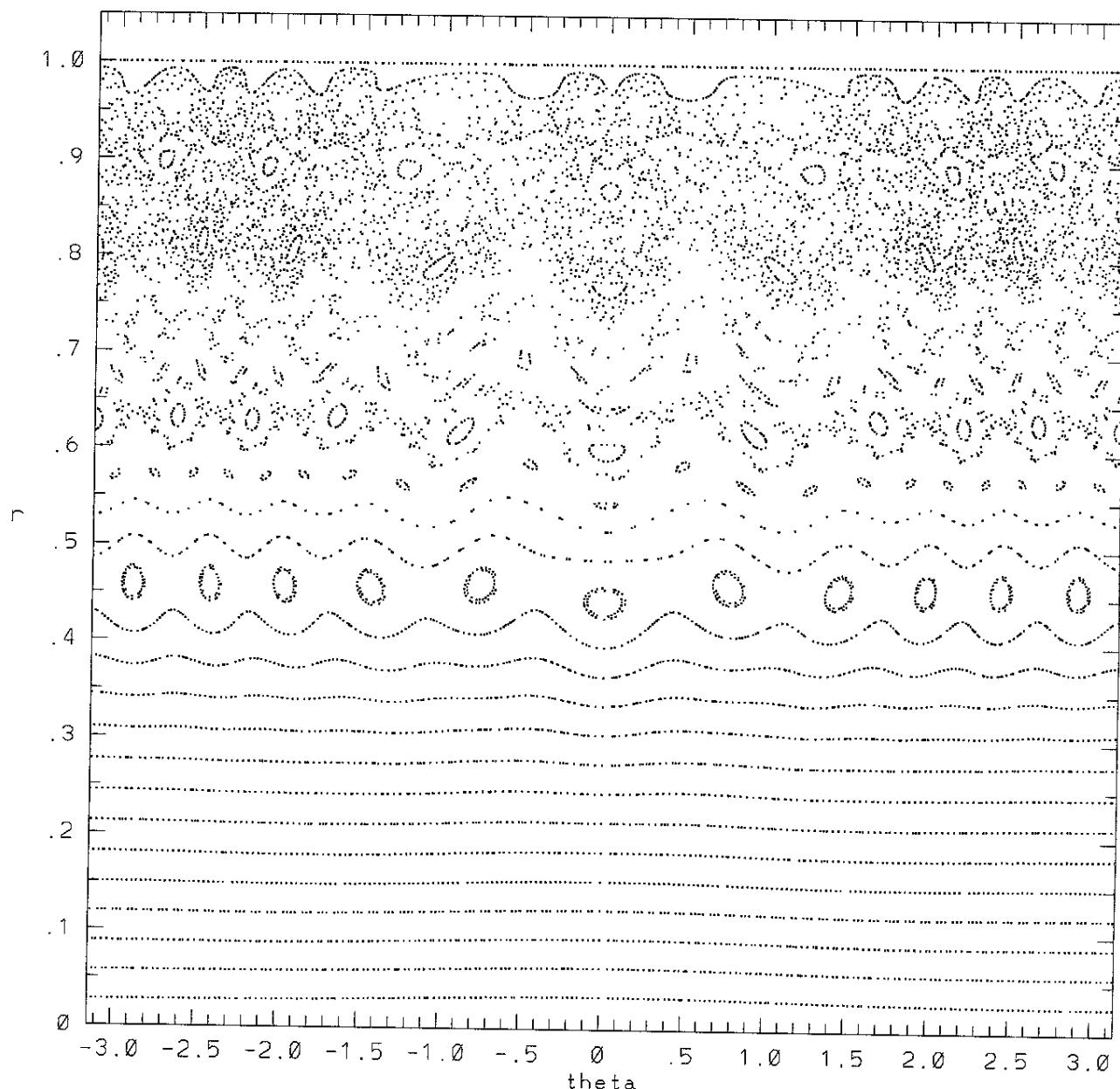


it= 1 rpoinc: background coordinates

Plot 10

C 82 after 1 iteration

Ballooning stable pressure

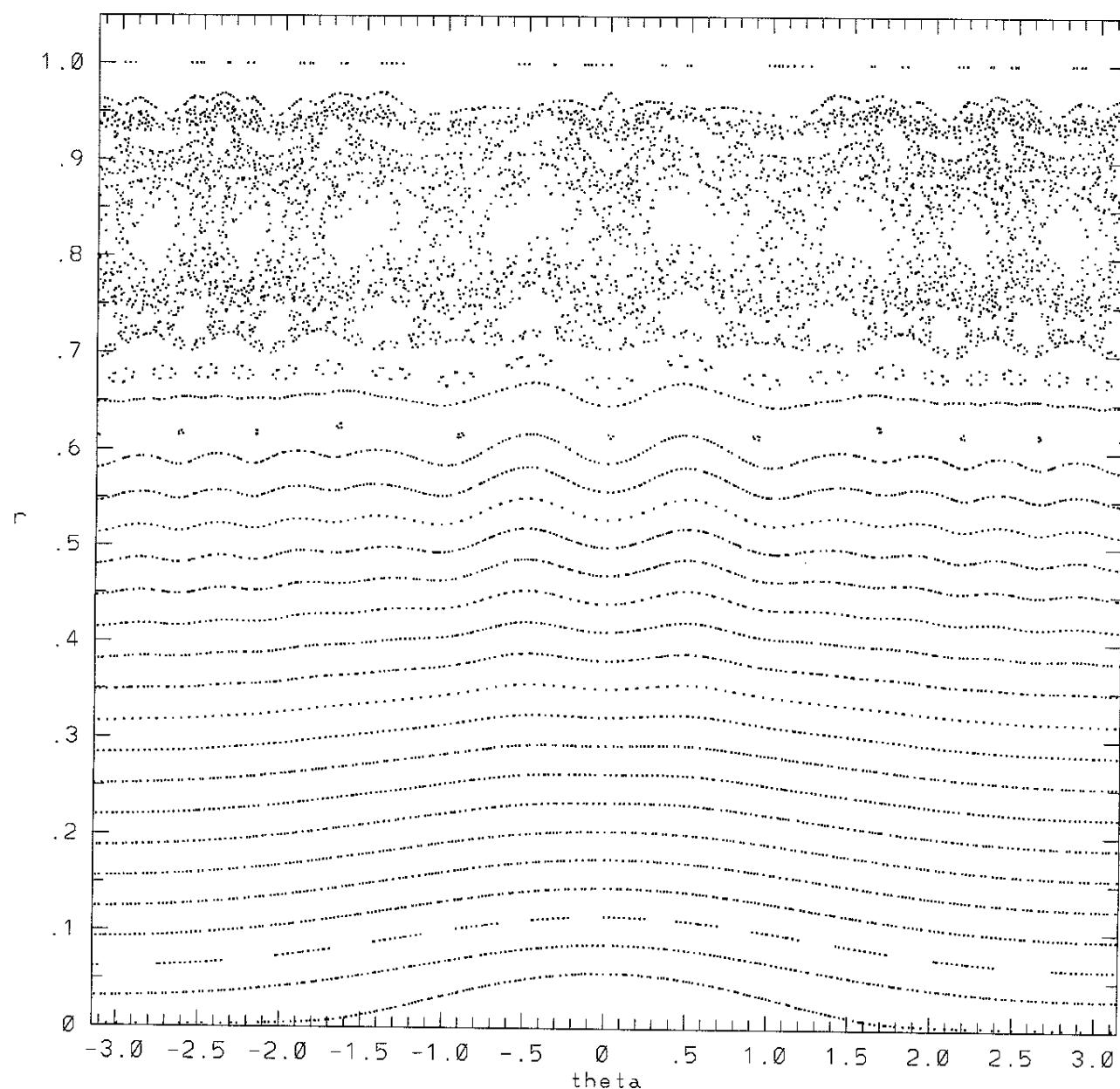


it= 1 nptinc: background coordinates

Plot 10

C8 2 after 8 iterations

Ballooning unstable pressure

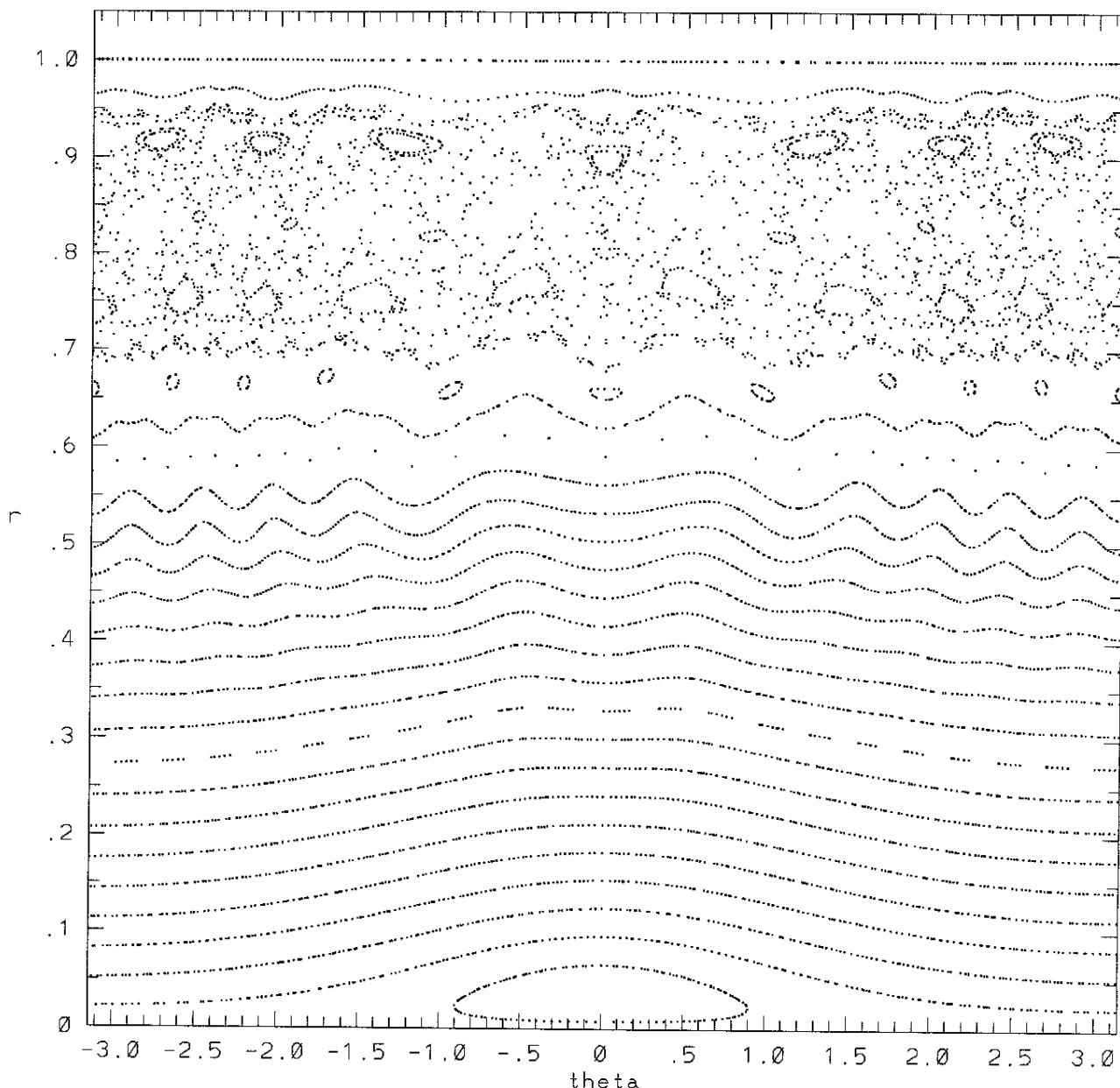


it= 8 rpoinc: background coordinates

Plot 73

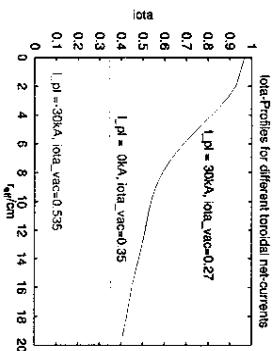
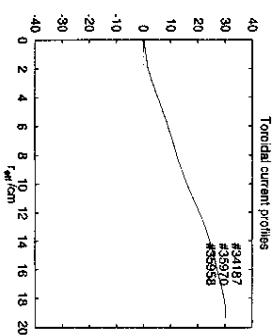
C 8 2 After 8 iterations

Ballooning stable pressure



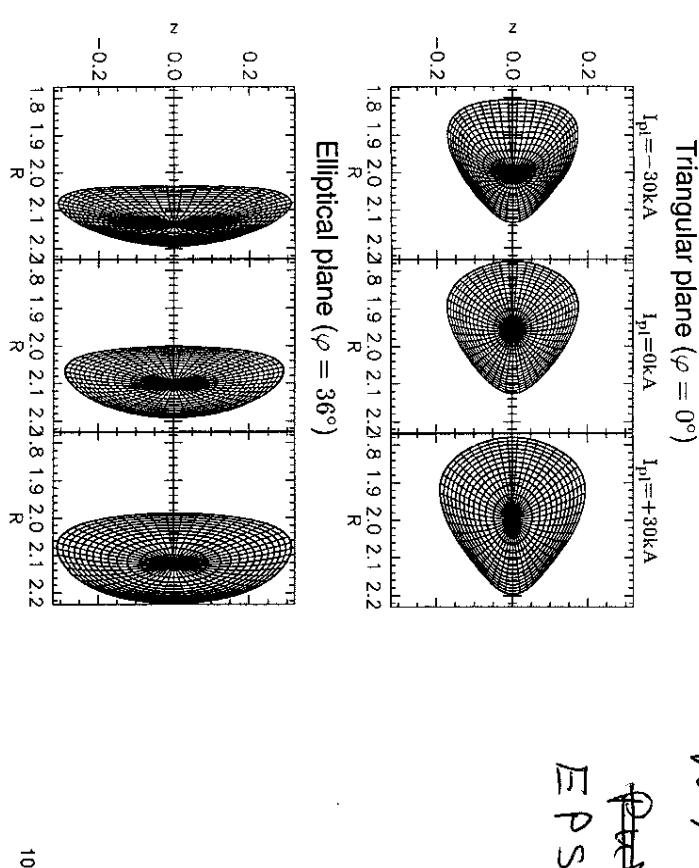
it= 8 rpoinc: background coordinates

Plot 73



Examples: Toroidal current and ι profiles (color coded)

- toroidal net-currents: bootstrap current (internal drive), inductive currents, Ohkawa current, ECCD current (external drives).
- change of ι -profile: $\Delta\iota(r_{\text{eff}}) \approx I_{\text{pl}}(r_{\text{eff}})R/(2\Phi(r_{\text{eff}}))$ for large aspect ratio.
- change of plasma boundary



WT-AS
EPS 1997

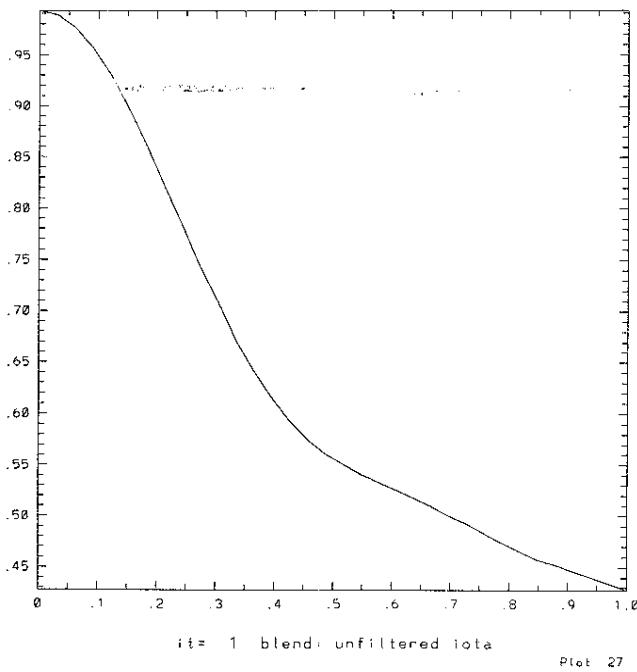
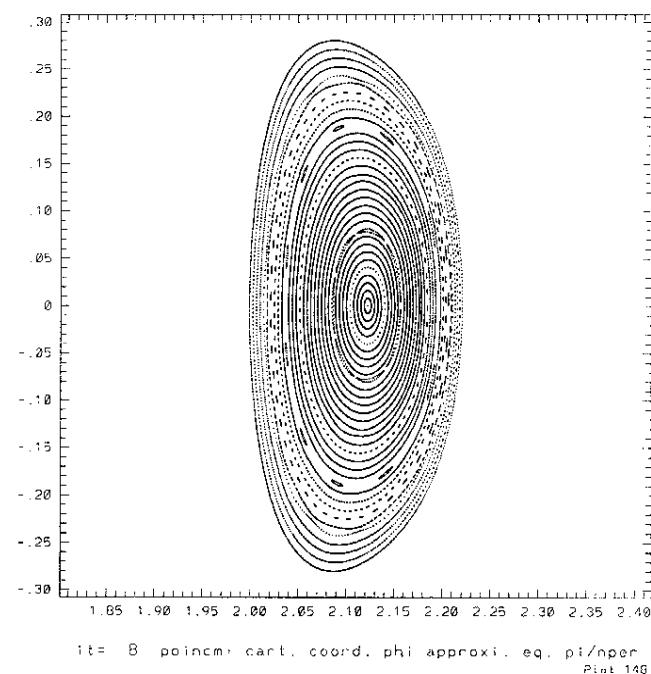
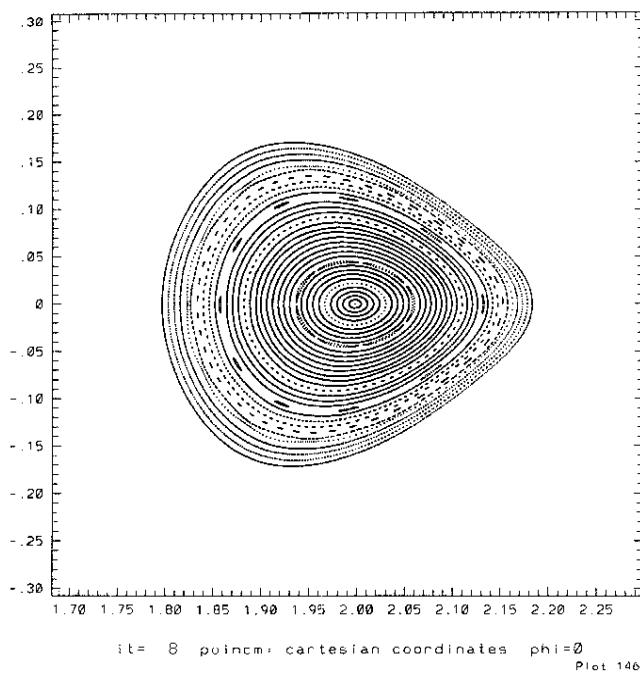
AUG-26-1999 10:19

PPPL - THEORY DEPARTMENT

609 243 2662 P.08/10

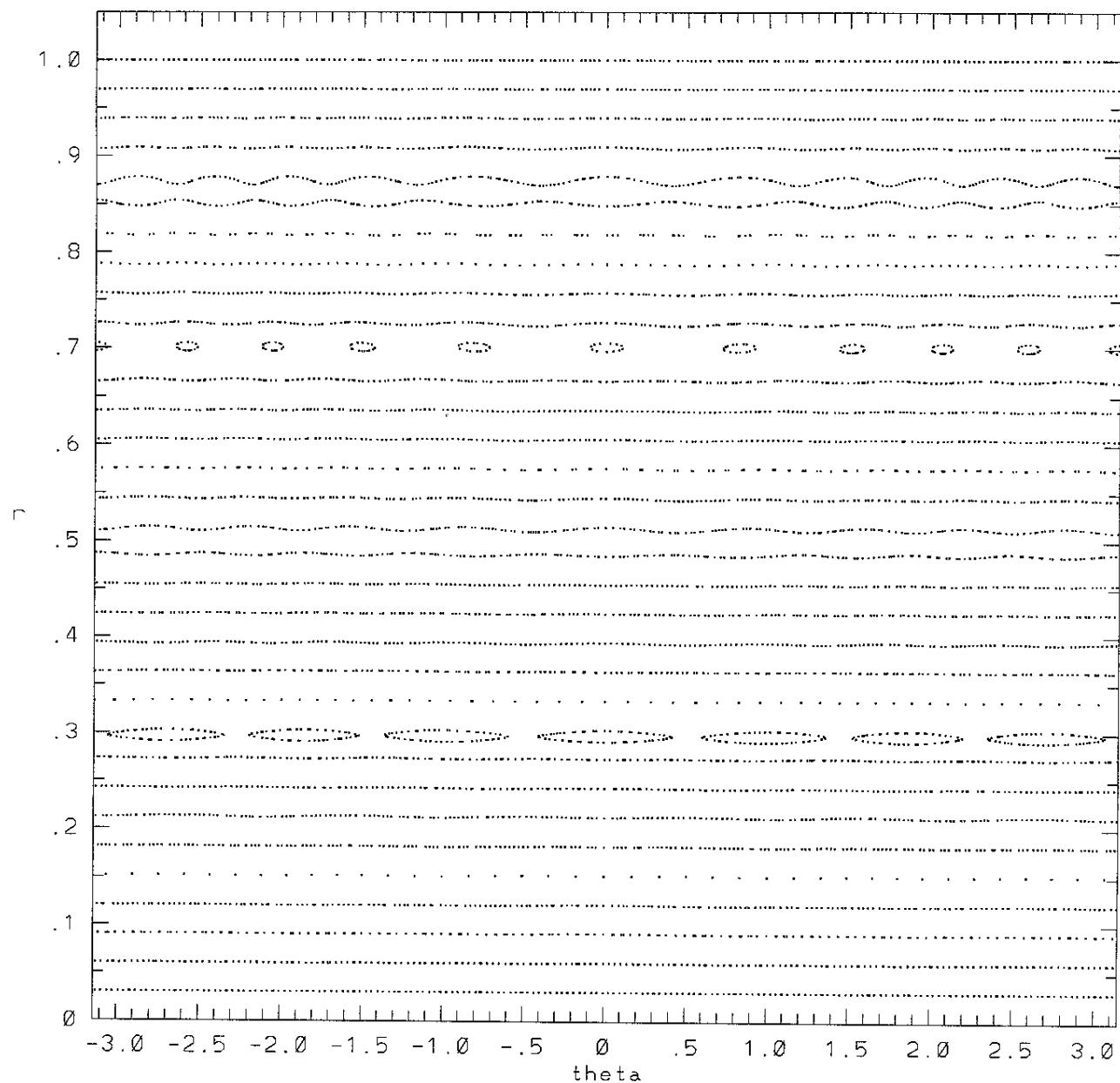
PIES RESULTS

for +30 KA W7-AS CASE



PIES RESULTS

FON + 30 KA W7-AS CASE



it = 16 rpoinc: background coordinates

Plot 127

CONFINEMENT 1996 IAEA

124

ERCKMANN et al.

W7-AS

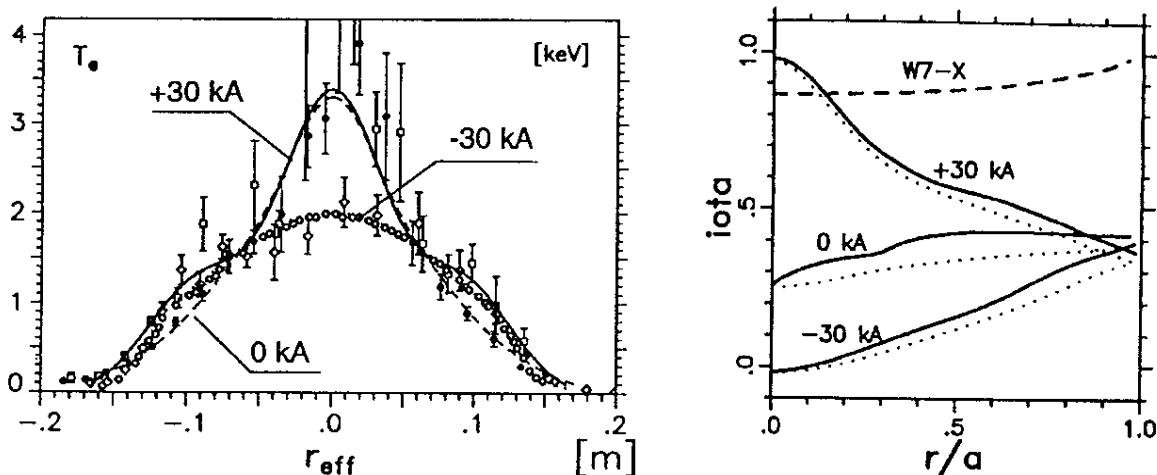


FIG. 5. Radial profiles of the electron temperature (left) with -30 kA (dotted line, diamonds), 0 kA (dashed line, dots) and $+30\text{ kA}$ (solid line, squares) and (right) the corresponding profiles of the total rotational transform (solid line). The inductive current contribution without bootstrap current is also indicated (dots). The ι profile of $W7-X$ is shown for reference.

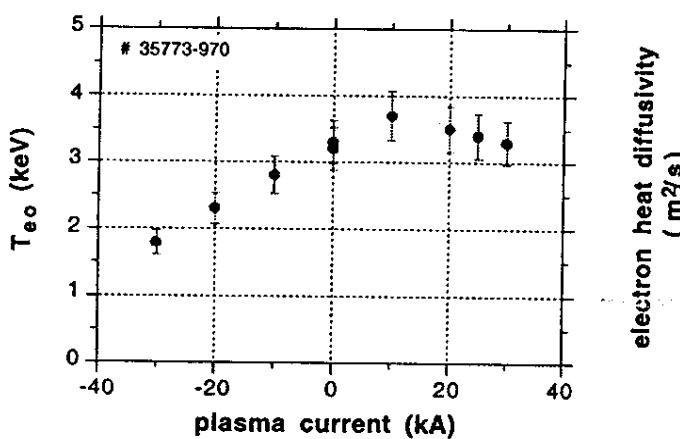


FIG. 6. Central electron temperature for discharges with different plasma current.

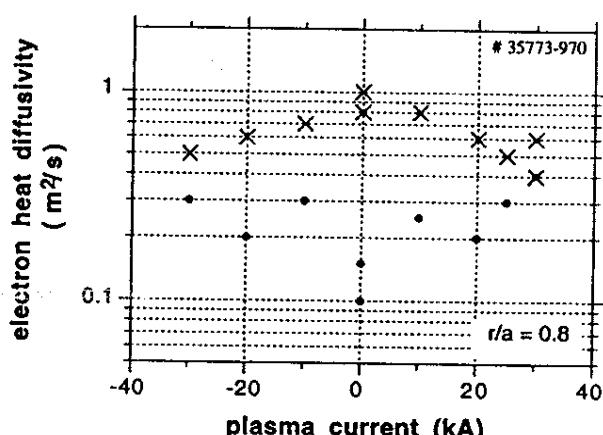


FIG. 7. Comparison of local electron heat diffusivity (crosses) from power balance analysis with neoclassical predictions (dots) at $r/a = 0.8$ for discharges with different plasma currents.

in between the two cases of Fig. 5. The ι -profiles as seen in Fig. 5 (right) are calculated assuming $Z_{eff}=2$, the inductive current distribution using the neoclassical resistivity (solid line) and the linear superposition of the bootstrap current contribution is shown (dotted line). The vacuum ι -profile of the $W7-X$ magnetic configuration, which has considerable shear at the edge, is displayed for reference. The current-voltage characteristic