Abstract Submitted
for the DPP05 Meeting of
The American Physical Society

Transport reduction in the edge of the RFX reversed-field pinch
G. SPIZZO[1], F. AURIEMMA[1], A. CANTON[1], S. CAPPELLO[1], A. CRAVOTTA[1], D.F. ESCANDE[2], R. LORENZINI[1], L. MARRELLI[1], P. MARTIN[1], R.B. WHITE[3], P. ZANCA[1] — Magnetic field lines and particle orbits are calculated with the code ORBIT for a typical multiple helicity (MH) chaotic field, provided by a MHD numerical simulation of the reversed-field pinch (RFP). The result (confirmed by an analytical Hamiltonian calculation) is that $m = 0$ and $m = 1$ modes allow for the formation of magnetic islands which induce transport barriers at $r/a \simeq 0.7 \div 0.8$. This model has been cross-checked with experimental data coming from the Padua experiment RFX. A particle transport analysis has been done, by means of the 1D transport code TED, to investigate the dependence of the particle diffusion coefficient D on mode amplitude. TED runs show that there is a decrease of D at $r/a \simeq 0.7$. ORBIT runs are consistent with TED results. Finally, we present preliminary data showing the active control of $m = 0$ modes in the recently rebuilt RFX-mod, aiming at reproducing (with a suitable choice of externally applied $m = 0$ amplitudes and phases) an ideal no-resonance, no-island condition, which corresponds, in the Hamiltonian formulation, to the presence of good flux surfaces at the $q = 0$ radius.

[1]Consorzio RFX, Euratom-ENEA Association, Padova, Italy
[2]UMR 6633-Université de Provence, Marseille, France
[3]Princeton Plasma Physics Laboratory

Paolo Franz

Date submitted: 21 Jul 2005 Electronic form version 1.4