Contribution ID: **105** Type: **Poster**

EX/P3-04: High Current Plasmas in RFX-mod Reversed Field Pinch

Wednesday, 10 October 2012 08:30 (4 hours)

High current (I_p up to 2 MA) operations in RFX-mod access the Single Helical Axis (SHAx) regime, during which the magnetic dynamics is dominated by the innermost resonant mode (m=1, n=-7): the magnetic chaos level is reduced and internal magnetic field configuration is close to a pure helix.
The best plasma performances at high Ip with pure SHAx states featuring electron transport barriers have been reached with shallow values of the reversal parameter F=B_t(a)/<B$_t$ $> (-0.05 < F < 0)$.
$The SH Ax states show back transitions to Multiple Helicity (MH) regime; at I\_p > 1.5 MA their total persistence is greater than 90\%$
$top. During the SH Ax state strong electron temperature (Te) gradients can show up, identifying an electron transport barrier. The$
$filter multichord system. The high T\_e gradients last up to 10-15 ms, more than the energy confinement time.$
$The strongest barriers in the central helical region are achieved at the lowest total amplitudes of them = 1 secondary modes. Improve$
$The T\_e profile measured inside the barrier is flat; to describe the transport in this region, electrostatic turbulence and subsequent v$
$2 mode activity has been considered as the source of the magnetic chaos.$
$In the region of the T\_e gradients, the main gas diffusion coefficient is one order of magnitude lower than the MH case and the conve$
$The large plasma volume external to the barrier is crucial to improve the global confinement. The Te gradients in the region 0.7 <$
$r/a < 0.95 increase at lower amplitudes of them = 0 modes, likely connected to a lowered edge turbulence. Lithium wall conditioning ex$
$promising experiments with more peaked density profiles and good density control upton/n\_G = 0.5 have been produced.$

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Session Classification: Poster: P3

Track Classification: EXC - Magnetic Confinement Experiments: Confinement