Contribution ID: **3093** Type: **not specified**

P1.1048 High-n tearing mode dynamics in fast rotating RFP plasmas

Monday, 8 July 2019 14:00 (2 hours)

See the full abstract here:
http://ocs.ciemat.es/EPS2019ABS/pdf/P1.1048.pdf

The Reversed Field Pinch (RFP) configuration is often characterized by a wide spectrum of unstable tearing modes (TMs) involved in the generation and sustainment of the magnetic field in the plasma. This dynamo process is heavily influenced also by other processes or parameters like intrinsic plasma flow (no external torque sources are normally present), wall resistivity and interaction with external non axi-symmetric magnetic fields provided by active coils. The transition between fast-slow rotation branches under the application of magnetic feedback boundary conditions was studied in [1] for the case of RFX-mod, a medium size (a = 0.459 m, R0 = 2m) flexible toroidal magnetic confinement device. In particular, RFXmod is equipped with an advanced and sophisticated feedback system realized by a grid of independently controlled 48 (toroidal) x4 (poloidal) active saddle coils. In this contribution the interaction of the m=1, n>9 tearing modes with the bulk plasma close to the fast-slow transition threshold is investigated with the help of a systematic set of experiments where the active feedback control is selectively switched on and off on specific modes during the discharge dynamics. The peculiar result found is that also in fast rotating discharges, although the radial component at the wall of high n tearing modes is almost zero, in the absence of active feedback control a gradual modification (growth) of the total mode amplitude is measured, leading potentially to wall locking of that mode and to the back transition to the slow rotation branch. Data showing the mode-mode and mode-wall interaction will be presented for several combinations of non-controlled TMs. The process is discussed also in function of the dynamics of the plasma flow, following the lines presented in [2], and showing the clear correlation between active control, MHD dynamics and plasma flow.

[1] P. Innocente et al., Nucl. Fusion 54 (2014) 122001
[2] B. Zaniol et al., P4.153, 42nd EPS Conference on Plasma Physics (2015)

pppo

Presenter: BOLZONELLA, T. (EPS 2019)

Session Classification: Poster P1

Track Classification: MCF