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P4.1061 Time evolution of electron temperature profiles in RFX-mod helical states

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RFX-mod (R = 2 m, a = 0.459 m) is the largest Reversed Field Pinch experiment which allowed characterizing the RFP plasmas up to currents of 2MA. Improved plasma performances are obtained when, in the resonant part of the m=1 spectrum, one dominant Tearing Mode is much higher than the other secondary ones (Quasi Single Helicity states), and the plasma core magnetic topology becomes helically shaped [Puiatti M.E. et al. 2015 Nucl. Fusion 55 104012]. Helical states and the amplitude of the dominant mode are not stationary: they increase with plasma current but are eventually interrupted by back transitions to Multiple Helicity states (all tearing modes have similar amplitudes). Moreover, even during helical states, minor magnetic reconnection events occurs, characterized by a sudden, though limited, increase of secondary modes. The dynamics of secondary modes still play an important role in helical states. The time evolution of the electron temperature profile during helical states is investigated by means of a Double Filter, multi-chord SXR diagnostic [Franz P. et al. 2013 Nucl. Fusion 53 053011]. High temperature structures are observed to occur more frequently in the first phase of the QSH (rising phase when the dominant mode is emerging from the set of m=1 modes) while in the stationary phase (when the amplitude of the dominant mode reaches a constant value) they are more intermittent. The role of secondary modes, and in particular the innermost ones n=8 and n=9, is investigated and compared with magnetic topology reconstructions performed with the ORBIT code [White R.B. and Chance M.S. 1984 Phys. Fluids 27 2455]

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