

## Edge turbulence approaching the density limit in RFX-mod experiment

M. Agostini, P. Scarin

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Abstract:

The boundary region of the RFX-mod reversed field pinch experiment is strongly influenced by the value of the electron density. With increasing density the magnetic topology in the plasma core and in the plasma edge changes, together with the statistical properties of the edge turbulent fluctuations. Using the density normalized to the Greenwald density ( $n/n_G$ ), two density regimes are identified: the low density regime at  $n/n_G \in [0.3, 0.4]$ , and the high density regime for  $n/n_G \in [0.4, 0.5]$ , without a clear threshold between them. At low density the plasma is dominated by the  $(m, n) = (1, -7)$  magnetic mode, which gives the same shape to the magnetic boundary; at higher density a strong  $(0, 1)$  mode rises. When increasing  $n/n_G$ , edge fluctuations develop strong non-Gaussian tails, turbulent structures become larger and their radial velocity become measurable with the gas puff imaging diagnostic when  $n/n_G \in [0.3, 0.4]$ . This phenomenology is described in detail for the two density regimes of RFX-m.