Turbulence in the edge of RFX-mod experiment in different magnetic topologies

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In experiments for thermonuclear fusion studies, the confinement performance is strongly affected by the physics of plasma transport in the edge region. In the RFX-mod Reversed Field Pinch experiment, this region is characterised by the presence of large fluctuations due to the development of coherent structures ("blobs"), strong gradients of electron density (n_e) and temperature (T_e) and a chain of m=0 magnetic islands. In this device, the edge is widely diagnosed: a Thermal Helium Beam allows the measurement of the time evolution of the radial profiles of n_e and T_e at high frequency (up to 0.5 MHz), the edge Thomson scattering system measures T_e and n_e, and the Gas Puff Imaging diagnostic characterises the edge fluctuations and the coherent structures. Moreover, high frequency magnetic fluctuations are detected with a set of internal magnetic coils.

The main properties of the coherent structures, such as their perpendicular dimension, amplitude and propagation velocity, are characterised; these quantities are compared with the radial characteristic lengths of the edge profiles and the different magnetic topologies, in order to give some hints on their possible interaction mechanisms.