Reconstruction of edge flow patterns on the RFX-mod experiment

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A detailed study of the edge flow properties performed in the outer region of the RFX-mod, the largest Reversed Field Pinch (RFP) device in operation is presented. Measurements were obtained using a Gundestrup probe [1], an insertable system equipped with ten graphite electrodes. Parallel and perpendicular flow, with respect to the magnetic field, were evaluated following a new method based on floating potential measurements allowing us to reconstruct both radial profiles in several low current discharges on a shot to shot basis. In this contribution, different cross-checks involving also interpretation models based on the ion saturation current measurements for the evaluation of the edge flow components will be presented as a validation of this new method [2].

The diagnostics time resolution allowed the study of the edge flow components fluctuations with respect to the edge local magnetic topology. In particular, we studied the time behavior of parallel and perpendicular flow components during special transients externally induced in low plasma current discharges to analyze the properties of the MHD m = 0 modes appearing as a chain of poloidally symmetric islands in the so called reversal region at the edge of the RFPs. Moreover, we carried out a similar analysis during the so called QSH states [3], the high plasma current improved regimes of the RFX-mod experiment, in which the plasma gets globally self-organized in a helical rotating tridimensional geometry. The edge flow fluctuations result well correlated with the local oscillations of the last closed flux surface associated to this magnetic topology.

References

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