

Magnetic and electrostatic structures measured in the edge region of the RFX-mod experiment

N. Vianello, M. Spolaore, R. Cavazzana,
E. Martines, G. Serianni, E. Spada, M. Zuin, V. Antoni

Consorzio RFX, Associazione Euratom-ENEA sulla Fusione, Corso Stati Uniti 4, 35127 Padova, Italy

Coherent structures emerging from turbulence background have been detected in the edge region of the RFX-mod Reversed Field Pinch fusion device. These structures, often referred in literature as “blobs”, have been previously characterized in the perpendicular plane and in their electrostatic character. In order to gain insight into their electromagnetic nature and features in the parallel direction a new and original probe system has been used that allows measuring both magnetic and electrostatic fluctuations simultaneously and on the same location with a high time resolution

In particular the system consists of two sets of electric and magnetic probes toroidally spaced by 88 mm. Each set is equipped with a 2-D array of Langmuir probes and a radial array of 3-axial magnetic coils. So that fluctuations of velocity patterns and relative vorticity, of density and pressure gradients and of current density are available simultaneously.

Statistical methods have been applied in order to detect structure-related bursts in the turbulence. It has been found that bursts correspond to pressure structures with vortex-like behavior in the cross-field plane and are related to current density filaments mainly oriented along the magnetic field, confirming what postulated by [1,2] and observed in [3]. The associated diamagnetic current density, due to pressure gradient fluctuations will also be provided together with a complete electromagnetic characterization of these structures in terms of current density, pressure perturbation and vorticity.

- [1] J. Bergmans, T.J. Schep PRL 87 (2001) 195002
- [2] J. R. Myra PPCF 14 (2007) 102314
- [3] Kirk et al. PPCF 48 (2006) B433