On the statistics of ELM filaments measured by fast low field side wall Langmuir probes on TCV

R.A. Pitts[1], A. Bencze[2], O. E. Garcia[3], M. Berta[4], G. Veres[2] and the TCV Team[1]

[1] *École Polytechnique Fédérale de Lausanne (EPFL), Centre de Recherches en Physique des Plasmas, Association Euratom - Confédération Suisse, 1015 Lausanne, Switzerland*

[2] *KFKI-RMKI, Assoc. Euratom-HAS, H-1121 Budapest, Hungary*

[3] *Assoc. Euratom-Risø National Laboratory, OFD-128 Risø, DK-4000 Roskilde, Denmark* [4] *Széchenyi István University, Assoc. Euratom-HAS, Győr, Hungary*

Complex filamentary or fine scale ELM structure has been observed and characterized in the scrape-off layer of the DIII-D [1], ASDEX and JET tokamaks [2]. In this contribution we report on the statistical properties of fine structures found in the ELM driven ion fluxes registered at the low field side main chamber walls of the TCV tokamak. An array of 19 tile embedded Langmuir probes located in a single poloidal line spanning $\approx$ 10cm above and below outboard midplane has been used to monitor both Type III ELMs observed in standard TCV ohmic H-modes and larger events obtained with third harmonic ECR heating. The probes are operated in ion saturation and acquired at 125kHz, revealing a rich filamentary structure, and substructure within individual filaments and providing information on the poloidal distribution of the ELM outflux. A detection-threshold-based method has been developed for identification of both individual ELM events and ELM filaments. With this approach, the spatial dependency of statistical properties such as the average number of filaments per ELM or the average filament duration has been established and a comparison made between low-field-side probes and additional similar arrays located at the outer and inner divertor targets. Using correlation techniques the character of fluctuations inside the ELM event is compared with the well known blob-like fluctuations observed in the inter-ELM periods and will be discussed in terms of recent modeling of radial blob propagation [3].

References

[1] D.L. Rudakov, et. al., Plasma Phys. Control. Fusion **44**, 717 (2002)

[2] M. Endler, et. al., Plasma Phys. Control. Fusion **47**, 219 (2005)

[3] O.E. Garcia, N.H. Bian and W. Fundamenski, Phys. Plasmas **13**,082309 (2006)