IAEA FEC 2014

Contribution ID: **195** Type: **Poster**

Comparative Study of High Triangularity H-Mode Plasma Performance in JET with Be/W Wall and CFC Wall

Thursday, 16 October 2014 08:30 (4 hours)

The ITER Q=10 baseline scenario requires good confinement (H98≈1) at sufficiently high density (≥0.85×nGW, where nGW is the Greenwald density). In JET-C (with CFC plasma facing components), raising the plasma triangularity (averaged triangularity>0.4) was the only way found to increase the plasma density near the Greenwald density while maintaining good confinement (H98>0.9). The situation in JET with the new ITER-like wall (ILW) is somewhat different. Whilst the confinement degradation with gas fuelling appeared to be compatible with that measured in JET-C, the positive influence of triangularity on confinement has not been yet recovered. High triangularity H-mode plasmas in JET-ILW exhibit lower betaN (<1.5) and lower pedestal pressure (mainly pedestal temperature) compared to JET-C with similar input power and D fuelling levels, and the confinement is strongly reduced to values close to those measured in the type III ELM regime in JET-C (H98<0.8). The lower pedestal temperature measured in JET-ILW appears to be linked to the high recycling conditions at which the experiments were conducted, with signs of inter-ELM divertor detachment. In order to shed some light on the mechanism responsible for this unexpected result, systematic comparisons of an extended database of JET-C and JET-ILW discharges have been carried out. Experiments in JET-C show the key role played by the pedestal temperature in the access to good confinement at high density. This is consistent with peeling-ballooning stability predictions, where the increased pedestal stability resulting from plasma shaping disappears at low edge currents (low pedestal temperature, high collisionality). The studies presented here focus on specific aspects of the highly shaped plasmas in JET-ILW, such as the impact of betaN in the edge stability at high triangularity, the different ELM dynamics seen in JET-C and JET-ILW, the increased plasma-wall interaction on the top of the vacuum vessel and the link between ELM frequency, W source and W accumulation which is particularly relevant for high triangularity plasmas where low ELM frequencies are expected.

This work was supported by EURATOM and carried out within the framework of the European Fusion Development agreement. The views and opinions expressed herein do not necessarily reflect those of the European Commission.

Paper Number

EX/P5-29

Country or International Organisation

Spain

Primary author: Dr DE LA LUNA, Elena (CIEMAT)

Co-authors: Dr SIPS, Adrianus (EFDA-JET); Dr LOARTE, Alberto (ITER Organization); Dr R. SOLANO, Emilia (CIEMAT); Dr RIMINI, Fernanda (CCFE); Dr SAIBENE, Gabriella (Fusion for Energy Joint Undertaking (F4E)); Dr

URANO, Hajime (JAEA); Dr FERREIRA NUNES, Isabel Maria (IPFN/IST); Dr BEURSKENS, Marc (CCFE); Dr NAVE, Maria Filomena (IPFN/IST); Dr GROTH, Mathias (Aalto University); Dr LOMAS, Peter (CCFE); Dr SARTORI, Roberta (Fusion for Energy Joint Undertaking (F4E)); Dr SAARELMA, Samuli (CCFE); Dr PARAIL, Vassili (CCFE)

Presenter: Dr DE LA LUNA, Elena (CIEMAT)

Session Classification: Poster 5