Istituto per la Scienza e Tecnologia dei Plasmi
Consiglio Nazionale delle Ricerche

Debriefing F13 session 21-22-23/05/2019
F13: EC assisted start-up
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D. Ricci

Goal and strategy

Goal

- Study of EC assisted plasma start-up with injection of impurity (mainly Ar and Ne) and null position influence with respect to the EC beam on FTU to compare results with data obtained on TCV (HLT-22 in 2017) in both the first and second harmonics. Moreover, the investigation of runway electron formation and suppression at start-up.
- Modelling of density and temperature time evolution and generated plasma current during discharges with EC-assisted start-up using BKD0. Extrapolation of the results to ITER and DEMO

Experimental strategy

Injection of Impurity:

At low Vloop test different impurity level (Ar, Ne or others) to verify capability of EC power to sustain startup in different gas mixture (mimic post disruption condition)

Control of null position wrt EC resonance layer:

Test assisted breakdown with resonance inside or outside the null, by varying the magnetic configuration action on vertical field o by varying the EC resonance position. Use different EC power level

RE. formation vs pressure/ EC power/ EC polarization/Injection angle

Scan prefill pressure (3 level) at different power (3 level) for the two polarization (OM1, XM2 and OM1 with oblique injection to convert at XM1) to test the formation of RE electrons.

Control of null position wrt EC resonance layer:

Control of null position wrt EC resonance layer:

XM2:

- 42901: B0 = 2T Rec = 0.75
- 42875: B0 = 2.7T Rec = 1.0 m
- 42900: B0 = 3T Rec = 1.12m

OM1:

- 42902: B0 = 4T Rec = 0.75
- 42864: B0 = 5.4T Rec = 1.0 m
- 42903: B0 = 6T Rec = 1.12m

Impurity injection (Ne) @ 5.4T

5.4T:

Shot	Ne(s/mbar)	EC pulse(ms)
42851	0	-
42849	0.5	-
42850	0.96	-
42864	0	200
42867	0.55	200
42866	1.0	200
42868	1.0	200
42869	1.5	200
42865	2.2	200

Impurity injection (Ne) @ 2.7T

2.7T:

Shot	Ne(s/mbar)	EC pulse(ms)
42881	0.0	-
42875	0.0	200 ms
42876	1.2	200 ms
42877	1.5	200 ms
42878	1.9	200 ms