(MAP) Session Report



June 21, 2024 (R. Yanai)

Date: June 20, 2024 Time: 10:22 - 16:44Shot#: 193613 - 193699 (87 shots) Prior wall conditioning: He GDC Divertor pump: On Gas puff: H₂, He, Ar, N₂, Ne IPD: Si, B LID: On

NBI#(1, 2, 3, 4, 5) = gas(H, H, H, H, H)=P(-, -, -, 0.9, -) MW ECH(77GHz) = ant(1.5-Uo, 5.5-U, 2-OUR)=P(-, 0.109 0.112) MW ECH(154GHz) = ant(2-OLL, 2-OUL, 2-OLR)=P(0.192, 0.204, 0.250) MW ICH(3.5U, 3.5L, 4.5U, 4.5L) = P(0.47, -, 0.4, 0.47) MW

Topics

- 1. Siliconization via powder injection (F. Nespoli(PPPL), S. Masuzaki, M. Shoji)
- 2. Super-long pulse discharge with integrated operation IPD, impurity seeding, RMP (S. Masuzaki)

Siliconization via powder injection F. Nespoli S. Masuzaki M. Shoji 2024.06.20 #193617-193657 R_{ax}=3.6 m

Goal: Study possible effects on wall conditions of injection of Si powder in the plasma. Foreseen reduction of

- intrinsic impurities
- recycling

scenario: 40 second ECH discharge in majority H2 plasma

- Si powder increases radiation
- Density maintained by feedback control
- Slight decrease of Te, no effect on Ti, thpugh Wp increases



Siliconization via powder injection F. Nespoli S. Masuzaki M. Shoji 2024.06.20 #193617-193657 R_{ax}=3.6 m

Goal: Study possible effects on wall conditions of injection of Si powder in the plasma. Foreseen reduction of

- intrinsic impurities
- recycling

scenario: 40 second ECH discharge in majority H2 plasma

- Si powder increases radiation
- Density maintained by feedback control
- Slight decrease of Te, no effect on Ti, thpugh Wp increases
- C concentration reduced during Si dropping, slight decrease of Fe, no clear change in O
- Gas puff discharges needed for evaluation of changes in recycling



Super-long pulse discharge with integrated operation

- IPD, impurity seeding, RMP -

Shot #: 193658 - 193699 ($R_{ax} B_{t}, \gamma, B_{q}$) = (3.9m, 2.631 T (sub-cool),1.2538, 100.0%) Working gas: He, H2 Imp. Gas: N2, Ne Powder: B I_{LID} = 1920A (O-point at 6-O)

Motivation

Sustaining stable long pulse discharge longer than 10 min.
with relatively high heating power.

Method

- To reduce divertor heat and particle loads, RMP detachment with impurity seeding was examined.
- To reduce C, O, and Fe, boron powder dropping was carried out.

Result

- Only ~ 120 s discharges were achieved.
- The operational conditions for the stable detachment could not be found.
- Boron powder dropping was not so effective for impurity reduction in this experiment.



S. Masuzaki