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EX/P5-09: Overview of the International Research on Ion Cyclotron Wall Conditioning

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This paper gives an overview of the experimental and modeling activity on Ion Cyclotron Wall Conditioning (ICWC), which is currently coordinated by the ITPA Scrape-Off-Layer & Divertor Topical Group, in order to assess the applicability of this technique for ITER for recovery from disruptions, vent or air leak, recycling control and mitigation of the tritium inventory build-up. Experimental results obtained on TORE SUPRA, TEXTOR, ASDEX-Upgrade, JET, KSTAR and LHD are presented. The conditions for safely producing RF plasmas with conventional ICRH antennas have been carefully investigated. Discharge homogeneity has been improved by adding a small poloidal component to the toroidal field. The use of pulsed discharges allows mitigating re-implantation of wall desorbed particles reionized in the ICWC discharge. A 0-D model of ICWC plasmas in He and H₂ has been developed which reproduces wall density, neutral and ion fluxes determined experimentally. Experimental observations in carbon devices and modelling seem to indicate that ICWC plasmas interact preferentially with transient reservoirs in carbon rather than in co-deposited layers. The found fuel removal rates are extrapolated to ITER, but it is pointed that efficiency with decrease with ICWC operation time.

Country or International Organization of Primary Author

CEA, IRFM

Collaboration (if applicable, e.g., International Tokamak Physics Activities)

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