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14.7 Analysis of metallic impurity content by means of VUV and SXR diagnostics in the presence of ICRF induced hot-spot on the JET-ILW poloidal limiter

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This paper presents a methods for the intrinsic impurity concentration measurements by means of VUV and SXR diagnostics on the JET-ILW tokamak. Measurements of mid-Z impurities content were obtained by means of VUV spectra. To provide absolute concentrations a new relative calibration technique has been proposed. It's based on cross-calibration with calibrated spectrometer by using unresolved transition array of W in the relevant wavelength range. The SXR cameras were used to deduce W profiles and poloidal asymmetries. Focus is given to hybrid discharges stopped by the real-time vessel protection system due to hot-spots formation. This effect was linked to the application of ICRH power. Local D2 gas injection allows mitigating hot-spot formation and run pulses with acceptable temperature values on vessel components. Hot spot temperature analysis showed a lower maximum temperature at higher gas rate. A decrease of impurity concentration with D2 injection rate was observed. Changes in the plasma current have a strong impact on the plasma-wall interaction, both via modifications in the edge density and in the fast-ion losses. Finally it was observed that at constant gas injection rate, both the hot spot temperature and the core impurity content decrease with the separatrix density.

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