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Detachment studies in the Magnum-PSI linear device IVO CLASSEN, RENATO PERILLO, WOUTER VIJVERS, RION BARROIS, GIJS AKKERMANS, RODERIK VAN DE LOGT, HENNIE VAN DER MEIDEN, HANS VAN ECK, THOMAS MORGAN, DIFFER - Dutch Institute for Fundamental Energy Research — Divertor detachment experiments on the Magnum-PSI linear device have been performed to investigate the relevant volume and surface processes responsible for detachment in tokamaks. The interaction of the plasma with a neutral background plays a crucial role in achieving a detached plasma regime. Detachment in Magnum-PSI is achieved by raising the H_2 background pressure by seeding near the target. Increasing the pressure up to 16 Pa showed a significant decrease in plasma pressure, heat flux and ion flux to the target. Radially resolved spectroscopy showed large deviations of the Balmer line ratios from pLTE, and will provide detailed information on the volume processes, comparing the experimentally observed line intensities to collisional radiative modelling. To study the plasma chemistry in Nitrogen seeded scenarios, the H_2+N_2 chemistry has been implemented in the PLASIMO code. This model suggests a modified molecular-activated-recombination (MAR) scheme in which N_2H^+ and NH play key roles. The strongly reduced set of primary reaction mechanisms suggested by PLASIMO is being implemented into B2.5-Eunomia. Experiments in Magnum-PSI using a mixed H_2/N_2 neutral background showed strong NH radiation from the plasma and significant fractions of N_2H in the residual gas analyser, qualitatively confirming the chemical processes proposed by PLASIMO.

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