# EFFECT OF IMPURITY SEEDING ON THE PLASMA PARAMETERS IN THE COMPASS DIVERTOR REGION

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We present results from swept Langmuir probe measurements of the plasma parameters before and during nitrogen, neon and argon impurity seeding in the divertor region of the COMPASS tokamak [1]. The radial distribution of the ion saturation current, the plasma potential, and the electron energy distribution function (EEDF) were studied in D-shaped, low-confinement mode (L-mode) deuterium discharges. The impurity puffing valve was on the low-field side (LFS) close to the outer strike point [3].

The probe measurements showed that prior to impurity seeding the EEDF in the divertor region can be approximated by a bi-Maxwellian distribution with a low-energy electron population (4 – 6 eV) and a group of higher energy electrons (10 – 25 eV) [2]. The impurity seeding led to Maxwellization of the plasma with an electron temperature of 5 – 7 eV, while the peaks on the strike points in the radial profiles of the electron temperature and ion saturation current disappeared during the seeding. The Maxwellization of the plasma in the LFS divertor was slower in comparison with the high-field side for all of the gases and needed higher rates of seeding. However, the discharges with nitrogen were stable and longer in comparison with argon and neon. We discuss a possible mechanism of transition from a bi-Maxwellian to a Maxwellian EEDF.

Seeding neon and argon caused their accumulation in the core plasma thus cooling it, which always resulted in a discharge disruption. This effect was more pronounced with the neon. It was found that the argon was a better cooler than neon – the shots were longer, meaning that the plasma was less disturbed than in the case of neon. Seeding argon succeeded in cooling the plasma in the entire divertor, even in the LFS. A Maxwellian EEDF was established in the divertor region within 50 ms after the seeding with a temperature of 5 – 9 eV, which decreased with time. In the case of neon, in this region the EEDF was still bi-Maxwellian with a maximum electron temperature of 13 eV.

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