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Impurities Removal during Central ECR Heating in T-10

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Experiments on impurities removal with central ECR heating on T-10 were carried out with various plasma parameters. CXRS and Zeff measurements show removal of carbon nuclei from plasma during central ECRH. There is a complex of high-power gyrotrons for ECRH experiments on T-10. Spectroscopic diagnostics of T-10 allows to measure carbon concentration by CXRS diagnostics [1] and to measure effective ion charge (Zeff) radial distribution from bremstrahlung intensity with subtraction of background molecular linear spectra.
Radial distribution of C+5 passive line intensity was measured simultaneously with CXRS measurements. This linear radiation allows to estimate ionization flux from C+5 into C+6 ions for calculation of C+6 particle confinement time τparticle:
Value of τparticle can be successfully defined only for impurities with relatively high Z (like carbon) due to the ionization flux into the nuclei in toroidal and poloidal coordinates for carbon impurity is homogeneous in T-10 conditions.
Carbon confinement time in OH regimes rises with increasing of line averaged electron density and decreasing of plasma current. In ECR heated regimes with PECR=1 MW one observes sharp decrease of carbon confinement time to a value τparticle≈23 ms, which is almost the same for various plasma parameters within the error limits.
The most contrast fall of τparticle is observed at high plasma densities when one observes sharp decrease of total carbon concentration during central ECRH, although carbon ionization flux in ECR regimes is about twice higher than in OH plasma.

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