**Impurity transport studies on the Globus-M tokamak**

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Transport of intrinsic impurities and corresponding radiated power in tokamak plasma will play an appreciable role in future tokamak fusion reactors. Although high radiating plasma boundary is preferable, accumulation of impurities in the core could lead to fuel dilution and deterioration of plasma confinement. The paper presents the results of 2-D reconstruction of radiated power profile and modelling of intrinsic impurity behaviour in the Globus-M plasma. The spherical tokamak Globus-M has following parameters: major radius \( R = 0.36 \) m, aspect ratio \( A = 1.5 \), plasma current \( I_p \leq 250 \) kA, toroidal magnetic field \( B_T \leq 0.5 \) T.

Diagnostic system for radiation losses study was upgraded with 24-channel linear array based on SPD silicon photodiodes [1] with field of view in the poloidal cross-section of the tokamak. Together with the \( 16 \times 16 \) SPD tangential matrix array it increased total amount of lines of view up to 280. Developed reconstruction procedure of the poloidal distribution of radiation losses assumed toroidal symmetry and used algorithm based on Tikhonov regularization method.

Measured radiation losses profiles were used for modelling of carbon transport with coupled ASTRA [2] and STRAHL [3] codes. Impurity concentrations were set such to match the experimental radiation losses distribution. Electron density and temperature profiles were provided by Thomson scattering measurements. Parameters of SOL plasma were obtained using Langmuir probes. Carbon diffusion and convection coefficients were achieved for steady state ohmic plasmas for toroidal magnetic field and plasma current scans.

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References