study of plasma Radiation losses on the globus-m tokamak

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Bolometer, a device with constant sensitivity in a wide wavelength range, is a traditional method for radiation losses measurements in tokamaks. Low time resolution is the substantial limitation of the standard bolometers that result in inability to investigate fast processes in plasma. SPDs (Silicon Precision Detectors) have high time resolution that could reach ~0.1 μs and high sensitivity of 25 A/W, constant in the 30 eV – 10 keV spectral range [1].

Penetration of fast plasma jet into the Globus-M plasma was investigated by means of the 16x16 SPD matrix array [2]. Dense plasma jet was injected using the two stage plasma gun [3] with 15 μs injection duration. Experiments were performed with different isotope composition of injected plasma. Plasma jet injection was carried out in the radial direction on the plateau of the discharges. Plasma current and average chord density were maintained constant. As the result of the experiments deep plasma jet penetration with considerable density rise in the plasma core was revealed.

One of the SPD feature is the reduced responsivity in the <30 eV energy range. The system based on 4 SPDs with filters was developed to investigate contribution of radiation losses from different spectral ranges in a whole plasma radiation. The work devoted to operational range determination of the system was made, the first results were achieved.

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Referances

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