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**METHOD FOR DETERMINING THE SHAPE OF MEASUREMENT AREAS OF HEAVY ION BEAM PROBING DIAGNOSTICS ON THE T-15MD TOKAMAK <sup>\*)</sup>**

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Diagnostics of heavy ion beam probing (HIBP) allows to measure the electric potential  $\phi_{pl}$ , its fluctuations  $\tilde{\phi}_{pl}$ , and fluctuations of electron density  $\tilde{n}_e$  and poloidal magnetic field  $\tilde{B}_p$  in the hot plasma region [1]. At present, NRC "Kurchatov Institute" is developing a project of a dual diagnostic complex of the HIBP for the tokamak T-15MD.

An important task is to determine the spatial resolution of diagnostics. One of the steps in this direction is the development of a method for determining the shape of measurement areas. To achieve this goal, a program code was developed in the Python programming language based on the HIBP-SOLVER code [2].

The tracing of a probing beam of finite diameter is carried out using the optimized position of ion guides [3]. Such a beam is represented as a set of thin beams (Fig. 1a). Based on the set of ionization points, a convex hull using the Quickhull algorithm [4] is constructed for the trajectories hitting the analyzer slits, which determines the shape of the measurement area (Fig. 1b).

This technique allows us to visualize the shape of the measurement areas of the HIBP. In further calculations, taking into account the focal distance and beam attenuation, the method will allow us to determine the volume of measurement areas and the spatial resolution of diagnostics.

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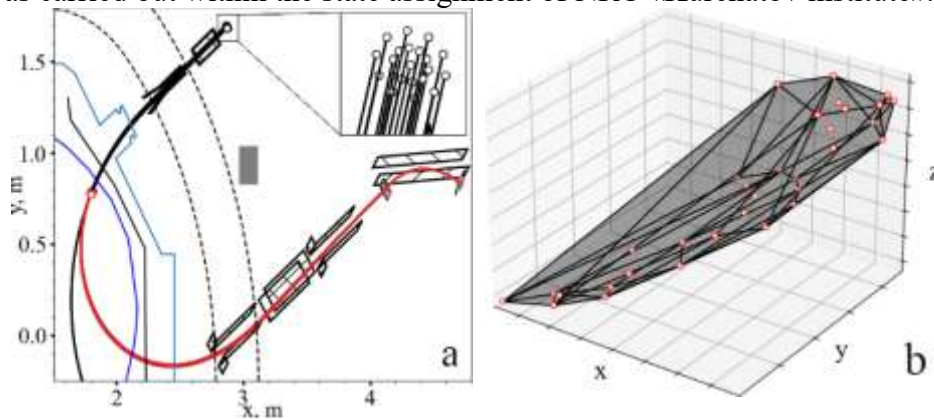


Fig. 1 a) Trajectory of a thick beam of probing ions; b) Shape of the measurement area plotted on a set of ionization points.

**References**

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<sup>\*)</sup> [abstracts of this report in Russian](#)