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SPECIFIC PROPERTIES OF THE HEAVY ION BEAM PROBING DIAGNOSTIC IN THE STELLARATOR SYSTEMS

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ABSTRACT

The Heavy Ion Beam Probing Diagnostic (HIBP) is an uniqu tool for plasma researches in fusion facilities. It has been successfilly realized up to now on a number of different devices with magnetic confinement. In principle, the HIBP gives an opportunity to measure simultaneously a few main plasma parameters as well as their fluctuations with a high temporal and spacial resolution.

The stellarator systems have significant features to insallation of the HIBP diagnostic on these facilities. The main of them : i) the toroidal magnetic fields may be comparable with poloidal one; ii) the stray magnetic field is very large, it can reach several hudreds Gs at distance (2-3) m from diagnostic ports; iii) number of the magnetic configurations (operational regimes) to be investigated by HIBP.

This paper presents the main steps of the HIBP installation on Uragan-2M, Liven'-2 and TJ-II stellarators. Particular attention allots :

- to optimization of three-dimensional probing particle trajectories and calculated detector grigs;

-to finding of the optimized geometrical and physical parameters for diagnostic installation;

- to develope and applicate active beam control system.

On the example of starting operation of the HIBP on TJ-II stellarator all these problems have been resolved.

8. Diagnostics