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STATUS OF THE WORK ON DESIGNING A PLASMA TARGET FOR THE NEUTRALIZING NEGATIVE ION BEAMS *)

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Injection of atomic beams is one of the most important methods of plasma heating in modern thermonuclear devices with magnetic plasma confinement. Energy of required atomic beams 0.5–1 MeV, power of required beams 10–100 MW. The atomic injector of the MeV energy range developed in the Budker Institute of Nuclear Physics as part of the federal project “Development of controlled thermonuclear fusion technologies and innovative plasma technologies”. This injector is based on accelerating and neutralizing negative hydrogen ions [1].

Plasma neutralizer is used to neutralize the accelerated beam. The efficiency of neutralization can be increased in comparison with a gas neutralizer. Neutralization efficiency reaches 85%.

A prototype of plasma neutralizer designed to neutralize a negative ion beam with current up to 9 A is being developed at the Budker Institute of Nuclear Physics. The plasma neutralizer is a plasma trap with multipole magnetic walls. The results of the first experiments on this prototype are presented in the report. Plasma parameters were measured at a low discharge power. The results of magnetic field optimization to obtain the required distribution of plasma parameters in the target are presented.

References

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*) abstracts of this report in Russian