

DOI: 10.34854/ICPAF.51.2024.1.1.232

THE OPERATION OF A NEGATIVE IONS SOURCE IN THE MODE OF LONG PULSES ^{*)}

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As part of the federal project "Development of technologies for controlled thermonuclear fusion and innovative plasma technologies", at the Budker Institute of Nuclear Physics of the Siberian Branch of the RAS, an atomic injector of the MeV energy range for heating is being developed, based on the acceleration and neutralization of a negative hydrogen ions beam. The injector uses a multi-aperture source with plasma generation by a high-frequency discharge and a surface-plasma mechanism of negative hydrogen ions generation.

The report describes the results of work carried out in 2023 to modernize the source and its power systems to produce a beam of negative ions with an energy of more than 100 keV, a current of more than 1 A and a pulse duration of up to 20 s. Various protective screens of the RF driver have been tested [2], their thermal conditions and conditions for stable operation of RF discharges with a power of up to 65 kW have been studied. Experimental data are presented on the efficiency of generating negative ion beam and the dependence of the beam characteristics on the power introduced in the RF driver, and voltages applied on the source ion-optical system electrodes.

The work was supported by the Ministry of Science and Higher Education of the Russian Federation.

References

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^{*)} [abstracts of this report in Russian](#)