COMPARATIVE ANALYSIS OF HIGH-FREQUENCY PLASMA DRIVERS WITH DIFFERENT FARADAY SCREENS FOR MULTISECOND OPERATION [[1]](#footnote-1)\*)

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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 [1].

In the BINP negative ion based neutral beam injector the beam of negative ions from the RF surface-plasma ion source is first accelerated in the source of negative ions to an energy of 120 keV, and then transported through the LEBT to the input of a single-aperture accelerator, which further accelerates the beam to a total energy of 0.4 - 1 MeV. Further, the accelerated negative ions are converted into high-energy atoms in a highly efficient plasma target [2].

The report describes the results of experiments on the formation of a beam with a current of up to 1.5 A and its transportation through the LEBT to the input of a wide-aperture accelerator, as well as the results of experiments on beam acceleration to an energy of 340 keV [3]. Eight-gap accelerator with an input aperture diameter of ø 260 mm were tested, 60% of the beam current obtained in the source and up to 90% of the beam current transmitted to the accelerator were accelerated and passed to the calorimeter. A further increase in the efficiency of beam transport through the LEBT section and its acceleration is expected to be obtained by increasing the energy of the beam outgoing the ion source and aiming the beam to the axis of the accelerator.

The dependence of the beam characteristics on the voltage at the source ion-optic system’s electrodes are given, the efficiency of beam transport under different vacuum conditions was studied as well.

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References

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1. \*) [abstracts of this report in Russian](http://www.fpl.gpi.ru/Zvenigorod/L/E/ru/KF-Sotnikov.docx) [↑](#footnote-ref-1)