

## INVESTIGATION OF THE CHARACTERISTICS OF AN INTENSE ION BEAM PROPAGATED OUTSIDE THE DIODE\*

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The transportation of an intense ion beam from the diode system [1] to the target has been studied. It was found that the angular ions divergence from the ideal (calculated) trajectory at the outer border of the beam, propagated outside the diode, was 10°. In this case, 26% of total beam energy was lost and the degree of positive beam charge compensation by electrons was 38%.

An approach for improving beam characteristics was proposed and studied [2, 3]. The ion beam was injected in the metal tube and due to the local divergence of ions the ion flux was partially closed on the inner tube wall. As a result, the ablation plasma was formed on the tube wall [4] and electrons entered into the ion beam. Thus, the full compensation of the beam space charge was provided.

The analysis of the radial profile of ion current showed that the drift tube provides an increase in the current density and beam energy in comparison with geometric focusing. Based on the data of the time-of-flight technique, the ion beam pulse had, as a rule, three peaks characteristic of the polyethylene coating of the anode. The first peak was corresponding to protons, the second and third ones - to singly and doubly ionized carbon ions. It was shown that the high density of ion current injected into the tube is mainly provided by protons. The relative content of protons in beam increased from 75.7% to 84.7%.

### REFERENCES

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