

Abstract Submitted
for the GEC11 Meeting of
The American Physical Society

Ion Source for Study of the Interaction of High Ion Fluxes with Fusion Relevant Plasma Facing Materials ALEKSANDER BIZYUKOV, IVAN BIZYUKOV, KOSTYANTYN SEREDA, OLEKSII GIRKA, V.N. Karazin Kharkiv National University — This work describes the theoretical and experimental study of properties of the Hall thruster with the ballistic and magnetic ion beam focusing (FALCON) [1]. Based on the ion trajectories numerical analysis, the improved shape of the cathode poles has been proposed, designed and manufactured. The current density profile has been obtained in the plane of the hydrogen beam crossover. It demonstrates the high power density localization. The set of experiments on the interaction of the intense hydrogen ions beam with the tungsten plates has been carried out. Significant weight-loss of the sample has been observed as a result of the bombardment. Corresponding erosion yield is 10-50 times higher than should be expected for sputtering mechanism. This indicates the anomalous surface erosion that could be caused by the blister formation. The experiment indicates the focusing efficiency of Hall thruster with implemented high current ion beam density and power density of a few MW/m² in the plane of crossover. The obtained results can be used in the development of the ion sources for simulation of the plasma-wall interactions either for ion beam processing techniques.

[1] M. Gutkin, A. Bizyukov, V. Sleptsov, I. Bizyukov, K. Sereda. FALCON. U.S. Patent No US 7,622,721 B2, 2008/0191629 A1

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Date submitted: 13 Jul 2011

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