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# MEASURING THE PARAMETERS OF EMISSION PLASMA IN ELECTRON SOURCE BASED ON ION-ELECTRON EMISSION *

*S.YU. DOROSHKEVICH, V.A. LEVANISOV, I.V. LOPATIN, M.S. VOROBYOV, M.S. TORBA, S.S KOVALSKY, S.A SULAKSHIN*

*Institute of High Current Electronics SB RAS, 2/3 Akademichesky Ave., Tomsk, 634055, Russian Federation.*

In electron sources with plasma emitters, which include sources based on ion-electron emission [1], the parameters of emission plasma affect the formation of ion-electron optics, the discharge current flow, the emission of charged particles into the accelerating gap, and, as a consequence, the electron beam generation [2]. That is why work is underway to measure the parameters of emission plasma and determine their dependence on the conditions of discharge and electron beam generation.

In this work, determination of the parameters of emission plasma was carried out in an electron source based on secondary ion-electron emission with the output of generated large cross section beam into the atmosphere [3,4]. The plasma ion emitter is formed by a self-sustained glow discharge with a hollow cathode and two thin-wire anodes. To determine the plasma parameters, we used a single cylindrical Langmuir probe with the possibility of moving inside the hollow cathode to measure the plasma concentration distribution in the region of glow discharge generation. Measurement and recording of probe bias voltage values and their corresponding current values was carried out by a specially designed automated measurement system. This measurement system captures points of the probe characteristic with a period of 20 μs, the maximum number of points stored in memory for a single measurement is 1000. To measure more points, the measurement system writes the data to the computer and repeats the measurement for 1000 more values. After measuring the required number of points, the system displays the obtained probe characteristic on the screen of a personal computer.

The following parameters of the emission plasma were obtained: plasma concentration ~ $10^8$ $cm^{-3}$, electron temperature ~ 3 eV, plasma potential relative to the hollow cathode ~ 200 V. The measured plasma parameters in different modes of glow discharge generation will be used in modeling the ion-electron optics of the electron source.

## References

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