PPPS 2019



Contribution ID: 868

Type: Poster

4P06 - Plasma source with multi-aperture extraction system for generating a ribbon electron beam

Thursday 27 June 2019 16:00 (1h 30m)

A plasma source of a ribbon electron beam for electron beam generating with a cross section of 10*250 mm in the fore-vacuum region of pressure was created. The cathode was a rectangular cavity with an extended slit. To increase the uniformity of the electron beam current distribution, a multi-aperture extraction system was used. A part of the anode, facing the extractor, contained 60 holes with a diameter of 3 mm, located along the line. In the extractor, holes with a diameter of 5 mm were made coaxially to the holes in the anode. The emission of electrons was carried out from a variety of holes when an accelerating voltage was applied between the anode and the extractor. At a distance of 10 cm from the electronic source, the electrons emitted by each hole were formed into one electron beam. This configuration of the accelerating gap made it possible to obtain an electron beam of the ribbon configuration with stable parameters in the forevacuum pressure range. The beam is formed by the emission of electrons from the hollow cathode discharge in the residual atmosphere of the vacuum chamber without the use of a gas inlet and a differential pumping system. On the basis of the developed source, the so-called plasma-beam discharge is implemented, and the possibility of using such a plasma generator in coating deposition technology is shown.

The work was supported by the grant of the Russian Foundation for Basic Research № 18-48-700015.

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Session Classification: Poster - Charged Particle Beams and Accelerators and High Energy Density Plasmas and Applications

Track Classification: 3.1 Plasma, Ion and Electron Sources