

Abstract Submitted  
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**Axial structure of the dc hollow cathode discharge at different modes** VALERIY LISOVSKIY<sup>1</sup>, ILLIA BOGODIELNYI, Kharkov National University, Svobody Sq.4, Kharkov 61022, Ukraine — This paper reports the axial profiles of the electron temperature, plasma concentration and plasma potential in a dc hollow cathode discharge in nitrogen registered with probe technique. At low pressure (0.05 Torr) the discharge is shown to burn in a high-voltage (electron-beam) mode. Electron temperature does not exceed 1 eV in the total plasma region excluding an abrupt growth in the vicinity of the cathode sheath boundary. A potential barrier is found near the cathode sheath boundary, for the current value of 1 mA the height of this barrier amounts to about 8 V. At gas pressure  $p \geq 0.15$  Torr two modes are well expressed: glow and hollow ones. At low discharge current a glow regime is observed in which the negative glow from the anode side possesses a wedge-like profile directed into the cathode cavity. At larger discharge current the discharge is burning in the hollow mode in which the cavity is filled with a high concentration plasma approaching  $2 \cdot 10^{10} \text{ cm}^{-3}$  and an electron temperature exceeding 2 eV. A potential well about 3 V deep is observed near the edge of the cathode cavity. On increasing the gas pressure the depth of the potential well in the cathode cavity decreases and it disappears at 0.5 Torr.

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