

Abstract Submitted  
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**Effect of inter-electrode gap on dc cathode sheath characteristics** VALERIY LISOVSKIY<sup>1</sup>, EKATERINA ARTUSHENKO, VLADIMIR YEGORENKOV, Kharkov National University, Svobody Sq.4, Kharkov 61022 — We found in experiment that increasing the inter-electrode distance with the current fixed first leads to the growth of the voltage drop  $U$  across the cathode sheath as well as of its thickness  $d$ . This phenomenon is observed when the anode is located in the negative glow of the dc discharge. With longer distances when the anode is located in the dark Faraday space or positive column, the quantities  $U$  and  $d$  approach their saturation values and then remain unchanged. The current through the negative glow is supported by fast electrons generated in the cathode sheath where they also gained energy as well as by a diffusion flow. The anode departure from the cathode within the negative glow leads to a decrease of the fast electron flow, therefore a higher voltage  $U$  is required to support a fixed current what is accompanied by the cathode sheath thickness  $d$  growth. This phenomenon is clearly manifested in argon and nitrogen whereas it is expressed much weaker in electronegative gases ( $N_2O$ ,  $O_2$ ). An analytical model is proposed describing the phenomenon outlined.

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