

Abstract Submitted  
for the GEC17 Meeting of  
The American Physical Society

**Electric field non-uniformity effect on dc low pressure gas breakdown between parallel plate electrodes** V.A. LISOVSKIY, R.O. OSMAYEV, A.V. GAPON, V.D. YEGORENKOV, Kharkov National University, 61022, Kharkov, Svobody Sq. 4, Ukraine — This paper presents the results of studying the gas breakdown in a non-uniform direct current electric field. The breakdown curves have been measured in nitrogen between flat electrodes of 12 mm in diameter spaced 3 to 300 mm apart and placed inside the discharge tubes of 13 mm and 56 mm in diameter. The effects of the non-uniform distribution of the electric field inside the inter-electrode gap and of the diffusion loss of charged particles to the discharge tube walls on the gas breakdown have been studied separately. A conclusion is drawn from the experimental data that the general form of the gas breakdown criterion must be as follows  $U = f(pL, L/R_{el}, L/R_{tube})$  in which the  $L/R_{el}$  ratio of the inter-electrode gap value to their radius describes the electric field nonuniformity inside the discharge tube whereas the  $L/R_{tube}$  ratio characterizes the diffusion loss of electrons on the discharge tube walls. It has been found that the breakdown curves for different electrode radius values and a fixed gap  $L$  intersect at such value of the gas pressure that corresponds to the location of the inflection point of the breakdown curve for a uniform electric field.

V.A. Lisovskiy  
Kharkov National University, 61022, Kharkov, Svobody Sq. 4, Ukraine

Date submitted: 31 May 2017

Electronic form version 1.4