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DC Breakdown of Low Pressure Gas in Long Tubes VALERIY LISOVSKIY, Kharkov National University, 4 Svobody sq., Kharkov, 61077, Ukraine, VERONIKA KOVAL, VLADIMIR YEGORENKOV — The gas breakdown was experimentally investigated in DC electrical field in long discharge tubes. The measurements were performed in the tubes of radius R = 1.5 mm, 4 mm, 27.5 mm, whereas the inter-electrode gap values varied in the range L = 1 – 250 mm. The conventional Paschen law was shown to hold in short discharge tubes for which L/R $\leq$ 1. At L/R $>$ 1 the breakdown curves U(p) are shifted not only to lower pressure values but also to higher dc voltage values with the gap value increasing i.e., one must employ the modified law of gas breakdown U (pL, L/R). At L/R $>$ 20 increasing L makes the dc breakdown curves to shift to higher U values, their minima being observed almost at the same gas pressure value. Our analytical model of gas breakdown in long tubes which takes into account ionization, transverse diffusion and electron drift as well as ion-induces secondary electron emission from the cathode surface predicts the experimental results quite well.

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