

SELF-ORGANIZATION ON CATHODES OF HIGH-PRESSURE GLOW MICRODISCHARGES*

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The possibility to describe normal spots and, in more general terms, structures on glow cathodes by means of the conventional glow discharge mechanisms has been extensively studied in the Soviet literature in the 1980s¹⁻⁵. Specifically, the role of diffusion was discussed. It was proved⁵ by means of the bifurcation theory that the conventional glow discharge mechanisms (drift, volume ionization and losses, γ -process) are sufficient to describe structures, while account of diffusion is not obligatory.

In the present work, the approach⁵ based on the bifurcation theory is generalized in order to be applicable not only to glow discharges in long tubes, which possess a well-pronounced positive column, but also to very short discharges which consist effectively only of the near-cathode region. Calculation results are given for conditions of atmospheric pressure glow discharge in Xe. It is found that the approach based on the bifurcation theory correctly describes trends of self-organization phenomena observed in the experiment⁶.

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