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**Influence of electric field non-uniformity degree**

 **on streamer process in air**

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In this paper it is considered the features of branching of streamers in electric fields with different degrees of heterogeneity, it is analyzed the stage of initiation of branching of streamers in a non-uniform electric field. The main task of the paper is the identification of the criterion of branching of streamers which would explain patterns of branching of streamers on the experience, and which could be confirmed by numerical simulations.

In the theoretical part of the paper it is given the review of the literature on the theory of streamer process, numerical and experimental studies of the streamer in the air.

In the experimental part of the paper it is carried out numerical study of propagation of streamers in fields with different degree of heterogeneity of the electric field in the package Comsol. The different models of the initial stage of branching of streamer, which propagate from the positive electrode are considered here. It is given a comparison of the results obtained from the numerical solutions and experiments.

Thus, it is simulated an appearance and a germination of streamer until the branch in the fields of varying degrees of heterogeneity. It is shown that streamer can branch in weakly inhomogeneous fields and in strong inhomogeneous fields. It is analyzed the stage of initiation of branching of streamer and proposed the criterion that determines the patterns of branching of streamer.

Publications list:

1. *L. A. Savelyeva, A. V. Samusenko, Yu. K. Stishkov* Reasons for branching of positive streamer in a non-uniform field / / Electronic Materials Processing, in print
2. *L. A. Savelyeva, A. V. Samusenko, Yu. K. Stishkov* Influence of electric field inhomogenity on streamer branching/ / Collection of papers of the Twelfth International Scientific-practical conference "Fundamental and applied research, development and application of high technologies in the industry." December 08 - 10 2011, St. Petersburg, Russia. Volume 2. / Ed. AP Kudinov. - St. Univ Polytechnic. Press, 2011. - 438 p., P. 213. ISBN 978-5-7422-3289-6
3. *L. A. Savelyeva, A. V. Samusenko, Yu. K. Stishkov, V. S. Sukhomlinov* Analysis of branching of streamer head / / Collection of reports of X International scientific conference "Modern Problems of Electrophysics and electrohydrodynamics of liquids". St. Petersburg, June 2012, in print