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CORONA DISCHARGE OPTIMISATION FOR MULTI-POINT PLANE CONFIGURATION

J. Koller, J. Píchal, V. Kříha, L. Aubrecht

Czech Technical University, Faculty of Electrical Engineering, Department of Physics
Technická 2, 166 27 Praha 6, Czech Republic, e-mail: koller@fel.cvut.cz

Results of experimental investigation of corona light emission for different point-to-plane electrode configurations are presented in this contribution. Studied corona discharge was burning in the air at atmospheric pressure. Electric field distribution for the same electrode configuration had been calculated, too. Paper compares measured and calculated data with respect to possible optimisation of the electrode's configuration the photo-multiplier in discrete points. Electric field intensity distributions were calculated by the integral equations method.

Results indicate that single point corona radiation may be correlated with emission of the point light source shaped as the truncated cone with smaller base placed in the vicinity of the point electrode's spike. Emitted light intensity distribution for combinations of two and three electrodes predicate that their light emission in dependence on the individual electrodes spacing resembles to that of more point sources combination. With decreasing inter-electrode spacing electric fields relevant to individual electrodes seem to interact. For three electrodes' configuration this interaction may result in suppression of the middle electrode's electric field, and hence its light emission, too.

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MEASUREMENTS OF VISIBLE RADIATION POWER FLUX ON THE TARGET SURFACE IRRADIATED BY POWERFUL PULSED PLASMA STREAM

V.N. Litunovsky, B.V. Ljublin

D.V.Efremov Scientific Research Institute of Electrophysical Apparatus, 196641, St. Petersburg, Russia

The study of plasma-material interaction at high level of irradiation power is actual problem due to variety of physical phenomenon during this process.

The knowledge of the energy flux on the target surface is necessary condition for prediction of material response and science-founded choice of irradiation conditions for technological application, such as material surface modification with powerful pulsed plasma streams.

The method of direct measurements of visible radiation power flux on the target (tungsten, graphite) surface irradiated by high power (P_{irr}=1-100 GW/m^2) pulsed (t_p=0.36 ms) plasma flows in experiments on the VIKA facility is described.

The method is based on the use of thin (~1 mm) quartz fiber for collimation and transportation of visible radiation (400 – 700 nm) to analysing or detection setup. The fiber was inserted into hole in the target. The optical tract was calibrated by means of certificated tungsten lamp.

Some data of the measurements are given too and it is shown that radiation flux determines in a considerable extent the power flux reached the target surface in the conditions of strong (~90%) shielding effect due to generation of high density low temperature erosion plasma layer above the target surface.