

Abstract Submitted
for the GEC08 Meeting of
The American Physical Society

Nanosecond pulsed surface dielectric discharge development

MARYIA NUDNOVA, Moscow Institute of Physics and Technology, ANDREI STARIKOVSKII, Drexel University — Subsequent images of surface nanosecond barrier discharge development were obtained with nanosecond time resolution. The velocities of discharge propagation were obtained, discharge uniformity and filling ratio of the gap by plasma has been investigated. SDBD modeling was performed in a hydrodynamic approximation for 3-dimensional geometry. To initialize the streamers formations near the edge of the high-voltage electrode the sinusoidal perturbation in the initial electron concentration was applied. The calculations of streamer propagation for such condition are discussed. The development of initial perturbation in X-Z plane is clearly seen. Developed streamers are not sensitive to initial pre-ionization. Also calculations with relatively small value of initial ionization $n_e(0) = 10^3 \text{ cm}^{-3}$ were carried out. Such initial concentration corresponds to single discharge propagation. The discharge propagation was calculated up to time $\tau = 2 \text{ ns}$. The mean velocity of the streamer was about 5 mm/ns, and typical size of single streamer was about 0.3 mm in good agreement with the experiment.

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Date submitted: 12 Jun 2008

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