Abstract Submitted
for the GEC10 Meeting of
The American Physical Society

Evidence for surface streamers self-synchronisation in N_2/O_2 mixtures ILYA MARINOV, OLIVIER GUAITELLA, ANTOINE ROUSSEAU, LPP, Ecole Polytechnique, UPMC, Université Paris Sud-11, CNRS, Palaiseau, France, LOW TEMPERATURE PLASMAS TEAM — Surface DBD discharges are widely used for surface treatment, in air purification reactors and as air flow control actuators. Mechanisms involved in streamer/surface interaction are still barely understood, especially for the breakdown phase. This work aims to prove streamer synchronized breakdown. Experimental setup consists of two high voltage electrodes kept at the same potential in contact with a Pyrex disk. iCCD imaging is done through a transparent salted water reservoir used as a grounded electrode. The pictures are collected if only one current peak occurs during the gate time of the camera. Statistical analysis shows the probability of synchronization (PS) i.e. detection of the plasma filaments simultaneously on both electrodes. PS is about 50% in air, 40% with a glass plate placed between the electrodes ($\lambda > 300$ nm) but PS is equal to zero when black filter is inserted. We propose photodesorbtion of charge deposited by the streamers during previous period to be the plausible synchronization mechanism. Dependence of PS on the oxygen content in the mixture shows an important role of O_2^-.

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Date submitted: 14 Jun 2010 Electronic form version 1.4