

Abstract Submitted
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Self synchronization of surface discharges KATIA ALLEGRAUD, ANTOINE ROUSSEAU, LPTP — Surface dielectric barrier discharges (SDBD) are mainly investigated for airflow control. In this paper, they are used to study surface processes in dielectric barrier discharges. A previous study has shown the self triggered behavior of a SDBD: the plasma initiates through several simultaneous and adjacent filaments around the electrode [1]. This phenomenon has been investigated under the name of collective effects, where the light of a first filament can trigger the ignitions its neighbors [1, 2]. It allows initiating several tens of streamers during a current peak of ~ 50 ns. In the present study, we propose to investigate the self synchronization of the discharge in a two electrodes system: the setup consists of two high voltage electrodes on the same glass plate. A third electrode, under the plate, is grounded. ICCD measurements show that the discharge appears simultaneously on both electrodes on a 50 ns time scale. Nanosecond resolved measurements of the streamers propagation reveal that the ignitions on one electrode can be delayed by few nanoseconds in respect to the other one. This means that the discharge from a first electrode can trigger the second one. Finally, iCCD measurements allow calculating the streamers propagation velocity, varying from 3.4×10^7 cm/s at the beginning of the propagation to 0.7×10^7 cm/s at the end of the propagation [3]. [1] K. Allegraud, O. Guaitella, A. Rousseau, J. Phys. D. : Appl. Phys. 40 7698–7706 (2007) [2] O. Guaitella, F. Thevenet, C. Guillard, A. Rousseau, J. Phys. D.: Appl. Phys. 39 2964–72 (2006) [3] K. Allegraud, A. Rousseau, submitted to IEEE Transactions on Dielectrics and Electrical Insulation

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